166019

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region IX

In The Matter Of: The Montrose Chemical Superfund Site, and Del Amo Superfund Site Los Angeles, California Groundwater Operable Unit Montrose Chemical Corporation of California, Inc., Respondent Proceeding Under Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (42 U.S.C. § 9606(a))	U.S. EPA Docket No. 2003-06

ADMINISTRATIVE ORDER

FOR INITIAL REMEDIAL DESIGN WORK

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I. INTRODUCTION AND JURISDICTION

A. This Administrative Order ("Order") directs the above-captioned Respondent to perform initial remedial design work for the remedy set forth in the Record of Decision for Dual Site Groundwater Operable Unit, Montrose Chemical and Del Amo Superfund Sites (March 1999) ("ROD") (Attachment 1 to this Order). This Order is issued to Respondent by the United States Environmental Protection Agency ("EPA") under the authority vested in the President of the United States by section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended ("CERCLA"), 42 U.S.C. § 9606(a). This authority was delegated to the Administrator of EPA on January 23, 1987, by Executive Order 12580, 52 Fed. Reg. 2923, January 29, 1987. This authority was further delegated to EPA Regional Administrators on September 13, 1987 by EPA Delegation No. 14-14-B, and was further delegated to the respective Superfund Branch Chief, by the corresponding Region IX delegation dated November 6, 2001.

B. Since August 27, 2002, Respondent has initiated, on a voluntary basis, some of the work that is required of Respondent under this Order, including a) compilation of other sources of environmental data, b) production well survey data, c) water level measurements, d) limited groundwater sampling and analyses and e) some preliminary engineering tasks. Respondent informed EPA that it was willing to undertake these activities because of Respondent's belief that initiating such activities will facilitate cost-effective activities by Respondent.

C. EPA has informed Respondent that EPA has determined that issuance of unilateral administrative orders for initial groundwater remedial design work is appropriate in order to properly document and manage the division of work between EPA, Respondent and Shell Oil

Company.

D. After discussing the Attached Statement of Work, Respondent has informed EPA that it is interested in performing the work required of Respondent under this Order because of Respondent's belief that undertaking such work will allow the preparation, by Respondent, of a cost-effective Remedial Design Work Plan, consistent with the EPA Record of Decision and with the District Court's finding of liability in the United States v. Montrose case (Case No. CV 90-3122-R).

E. Following the issuance of this Order, EPA intends to initiate special notice negotiations with Respondent for groundwater remedial design response actions pursuant to CERCLA Section 122(e), 42 U.S.C. Section 9622(e). The issuance of this unilateral administrative order will allow initial remedial design activities by Respondent to continue while these negotiations are occurring and as a result, will expedite the remedial design process.

II. FINDINGS OF FACT

1. History

A. The Montrose and Del Amo National Priorities List Superfund Sites (the "Sites") are located in Los Angeles County, California. The Del Amo Superfund Site was added to the CERCLA National Priorities List in 2003. The Montrose Superfund Site was added to the CERCLA National Priorities List in 1989.

B. Respondent operated a technical grade dichloro-diphenyltricloroethane (DDT) pesticide manufacturing plant at 20201 Normandie Avenue in Los Angeles, California from 1947

to 1982 (the Montrose Plant property).

C. From 1942 through 1971, a synthetic rubber manufacturing operation, consisting of three separate plants, covered 280 acres at the Del Amo Site. From 1942 until 1955, the rubber manufacturing operation consisted of a styrene plant operated by Dow Chemical Company, a butadiene plant operated by Shell Oil Company, and a synthetic rubber (copolymer) plant operated by U.S. Rubber Company, Goodyear Tire & Rubber Company, and others. During this period, the United States owned all three plants, which were operated by the above-noted companies under agreements with the United States. In 1955, the United States sold all three plants to Shell Oil Company, and Shell continued to operate these plants until 1971.

D. Since 1985 Respondent has been conducting a remedial investigation/feasibility study (RI/FS) for the Montrose Chemical Superfund Site under an administrative order on consent with EPA. Since 1992, Shell Oil Company has been conducting an RI/FS for the Del Amo Superfund Site.

2. Respondent

Respondent, Montrose Chemical Corporation of California, Inc., operated a DDT manufacturing plant at 20201 Normandie Avenue, Los Angeles County, California from 1947 until 1982.

3. Releases of Hazardous Substances

A. Releases of hazardous substances, pollutants or contaminants from the former DDT pesticide manufacturing plant operated by Montrose Chemical Corporation, including but

not limited to chlorobenzene, DDT and parachlorobenzene sulfonic acid, have resulted in hazardous substance contamination in the groundwater. Chlorobenzene is present in groundwater at concentrations up to approximately 400,000 ppb.

B. Releases of hazardous substances from the former Del Amo Synthetic Rubber Manufacturing plant, including but not limited to benzene, ethylbenzene, trichloroethylene (TCE) and naphthalene, have resulted in hazardous substance contamination in groundwater. Benzene is present in groundwater at concentrations up to approximately 1,700,000 ppb.

C. Contamination in groundwater (i.e. contamination in the dissolved phase) from the Montrose and Del Amo Superfund Sites has partially commingled or merged. As a result, the dissolved phase groundwater contamination from the Sites is being addressed by EPA as a single technical problem.

D. There is an undetermined quantity of chlorobenzene in the form of dense non-aqueous phase liquid (DNAPL) in the vadose zone and in groundwater beneath and adjacent to Montrose Plant Property. This DNAPL contains a significant percentage of dissolved phase DDT (while DDT does not appreciably dissolve in water, it dissolves readily in chlorobenzene). This DNAPL represents a major source of contamination that will continue to threaten groundwater indefinitely.

E. Hazardous substances originating at the Montrose Plant Property and the Del Amo Synthetic Rubber Plant Property have migrated in groundwater up to 1.3 miles downgradient from these properties.

4. Summary of Risks

A. Human health excess cancer risks from consumption of contaminated groundwater at the Sites are as much as 12,000 times greater than the level that EPA considers acceptable. Currently, contaminated groundwater at the Sites is not being used, in part due to the contamination. However, the State of California has classified the groundwater at the Sites as potential sources of drinking water. Hazardous substance contamination in the groundwater at the Sites exceeds drinking water maximum contaminant levels for a number of hazardous substances including but not limited to chlorobenzene, benzene, ethylbenzene, chloroform, and TCE.

B. Actual or threatened releases of hazardous substances to and in groundwater at the Sites may present an imminent and substantial endangerment to public health, welfare, or the environment.

5. Record of Decision

A. The Record of Decision for Dual Site Groundwater Operable Unit, Montrose and Del Amo Superfund Sites (March 1999) (ROD) selected remedial actions to address potential human exposures to contaminated groundwater at the Sites, and to restore groundwater in the area. The ROD is based on the underlying administrative record which includes, but is not limited to, the Final Remedial Investigation Report for the Montrose Superfund Site (1998), the Final Groundwater Remedial Investigation Report for the Del Amo Study Area (1998) and the Joint Groundwater Feasibility Study for the Montrose and Del Amo Sites (1998). The ROD was issued after public notice and comment on EPA's proposed groundwater remedial actions and the

administrative record file. EPA's consideration of and responses to comments received from members of the public during the public comment period are contained in Volume II of the ROD.

B. The ROD selected a number of remedial actions, including a number of different technologies and approaches, to address groundwater contamination at the Sites including but not limited to:

> containment of dissolved-phase groundwater contamination that surrounds the non-aqueous phase liquid that is present in portions of the groundwater at the Sites; and
>
> reduction of concentrations of dissolved contaminants in groundwater, outside the area of groundwater being contained, to levels that no longer pose an unacceptable risk to human health.

6. Enforcement Efforts

A. In 1994, EPA issued a notice letter to Respondent notifying Respondent that EPA considered Respondent to be a potentially responsible party with respect to response costs that had been or may be incurred with respect to the groundwater contamination at the Montrose Chemical Superfund Site and the Del Amo Superfund Site.

B. In 1990, EPA filed suit against Respondent and others seeking past response costs and a declaratory judgment with respect to future response costs related to the Montrose Chemical Site (United States v. Montrose et al. Case No. CV 90-3122-R). That case has not yet concluded. However, in April 2000, the District Court issued an order finding Respondent,

among others, liable for all costs of removal or remedial action with respect to releases at or from the Montrose Plant property.

C. After discussing the Attached Statement of Work with EPA, Respondent has informed EPA that it is interested in performing the work required of Respondent under this Order because of Respondent's belief that undertaking such work will allow the preparation, by Respondent, of a cost-effective Remedial Design Work Plan, consistent with the EPA Record of Decision and with the District Court's finding of liability in the United States v. Montrose case (Case No. CV 90-3122-R).

III. CONCLUSIONS OF LAW AND DETERMINATIONS

7. The Montrose Chemical Superfund Site is a "facility" as defined in Section 101(9) of CERCLA, 42 U.S.C. Section 9601(9). The Del Amo Superfund Site is also a "facility" as defined in Section 101(9) of CERCLA, 42 U.S.C. § 9601(9). The Joint Site as set forth in Section 6 of the ROD is also a facility as defined in Section 101(9) of CERCLA § 9601(9).

8. Respondent is a "person" as defined in Section 101(21) of CERCLA, 42 U.S.C. § 9601(21).

9. Respondent is a "liable party" as defined in Section 107(a) of CERCLA, 42 U.S.C. § 9607(a), and is subject to this Order under Section 106(a) of CERCLA, 42 U.S.C. § 9606(a).

10. Chlorobenzene, benzene, DDT, DDE, DDD, PCE, TCE, chloroform, naphthalene, ethylbenzene and other contaminants are present in the commingled contaminated groundwater

plume at the Montrose Chemical and Del Amo Superfund Sites and are "hazardous substances" as defined in Section 101(14) of CERCLA, 42 U.S.C. § 9601(14).

11. The disposal and subsequent migration of hazardous substances at the Sites constitute a "release" as defined in Section 101(22) of CERCLA, 42 U.S.C. § 9601(22).

12. The actual and potential for future migration of hazardous substances at and from the Sites poses a threat of a "release" as defined in Section 101(22) of CERCLA, 42 U.S.C. § 9601(22).

13. The release and threat of release of one or more hazardous substances at and from the Montrose Chemical or Del Amo Superfund site may present an imminent and substantial endangerment to the public health or welfare or the environment.

14. The groundwater contamination and endangerment at the Sites constitute an indivisible injury for which the Respondent is jointly and severally liable. The actions required by this Order are necessary to protect the public health or welfare or the environment.

IV. NOTICE TO THE STATE

15. Prior to issuing this Order, in December 2002 and on other occasions subsequent to that date, EPA notified the California Environmental Protection Agency, Department of Toxic Substances Control, that EPA would be issuing this Order.

V. ORDER

16. Based on the foregoing, Respondent is hereby ordered to comply with the following provisions and requirements of this Order, including, but not limited to, all attachments to this Order, all documents incorporated by reference into this Order, or incorporated by reference into this Order, and all schedules and deadlines in established by or through the attached Statement of Work.

VI. DEFINITIONS

17. Unless otherwise expressly provided herein, terms used in this Order which are defined in CERCLA or in regulations promulgated under CERCLA shall have the meaning assigned to them in the CERCLA or its implementing regulations. Terms specifically defined in the ROD shall have the same definition as in the ROD, unless otherwise noted below. Whenever terms listed below are used in this Order or in the documents attached to this Order or incorporated by reference into this Order, the following definitions shall apply:

A. "CERCLA" shall mean the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. §§ 9601 et seq..

B. "Day" shall mean a calendar day unless expressly stated to be a working day. "Working Day" shall mean a day other than a Saturday, Sunday, or Federal holiday. In computing any period of time under this Order, where the last day would fall on a Saturday, Sunday, or Federal holiday, the period shall run until the end of the next Working Day.

C. "DTSC" shall mean the California Environmental Protection Agency, Department of Toxic Substances Control.

D. "EPA" shall mean the United States Environmental Protection Agency.

E. "National Contingency Plan" or "NCP" shall mean the National Contingency Plan promulgated pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, codified at 40 C.F.R. Part 300, including any amendments thereto.

F. "Paragraph" shall mean a portion of this Order identified by an arabic numeral.

G. "Performance Standards" shall mean those cleanup standards, standards of control, and other substantive requirements, criteria or limitations, identified in the Record of Decision, that the remedial action and/or the Work required by this Order must attain and maintain (including, but not necessarily limited to, the requirements and specifications identified in pages 38 through 46 of the Record of Decision and in Attachment A to the Record of Decision).

H. "Record of Decision" or "ROD" shall mean the EPA Record of Decision for Dual Site Groundwater Operable Unit, Montrose Chemical and Del Amo Superfund Sites (March 1999) (two volumes) (Attachment 1 to this Order).

I. "Remedial Design" or "RD" shall mean those activities to be undertaken by Respondent to develop the final plans and specifications for the remedial action. "Initial Remedial Design Work" shall mean that portion of the Remedial Design being conducted by Respondent under this Order.

J. "Respondent" shall mean the Montrose Chemical Corporation of California, Incorporated.

K. "Response Costs" shall mean all costs, including direct costs, indirect costs, and accrued interest, incurred by the United States to perform or support response actions at the Sites. Response costs include but are not limited to the costs of overseeing the Work, such as the costs of reviewing or developing plans, reports and other items pursuant to this Order and costs associated with verifying the Work.

L. "Statement of Work" or "SOW" shall mean the statement of work for implementation of the Initial Remedial Design Work, as set forth in Attachment 2 to this Order. The Statement of Work is incorporated into this Order and is an enforceable part of this Order.

M. "Section" shall mean a portion of this Order identified by a roman numeral and includes one or more paragraphs.

N. "Sites" unless otherwise specified shall mean the Montrose Chemical and Del Amo national priorities list Superfund sites.

O. "State" shall mean the State of California.

P. "United States" shall mean the United States of America.

Q. "Work" or "Initial Remedial Design Work" shall mean those activities that Respondent is required to perform under this Order.

VII. NOTICE OF INTENT TO COMPLY

18. Respondent shall provide, not later than five (5) days after the effective date of this Order, written notice to EPA's Remedial Project Manager (RPM) stating whether Respondent will comply with the terms of this Order. If Respondent does not unequivocally commit to perform the RD as provided by this Order, Respondent shall be deemed to have violated this Order and to have failed or refused to comply with this Order. Respondent's written notice shall describe, using facts that exist on or prior to the effective date of this Order, any "sufficient cause" defenses asserted by Respondent under sections 106(b) and 107(c)(3) of CERCLA. The absence of a response by EPA to the notice required by this paragraph shall not be deemed to be acceptance of Respondent's assertions.

VIII. PARTIES BOUND

19. This Order shall apply to and be binding on Respondent as identified in Paragraph 2, its directors, officers, employees, agents, successors, and assigns. Respondent is responsible for carrying out all activities required by this Order. No change in the ownership, corporate status, or other control of Respondent shall alter any of the Respondent's responsibilities under this Order.

20. Respondent shall provide a copy of this Order to any prospective owners or successors before a controlling interest in Respondent's assets, property rights, or stock is transferred to the prospective owner or successor.

21. Respondent shall provide a copy of this Order to each contractor, sub-contractor, laboratory, or consultant retained to perform any Work under this Order, within five (5) days

after the effective date of this Order or on the date such services are retained, whichever date occurs later. Respondent shall also provide a copy of this Order to each person representing Respondent with respect to the Work and shall condition all contracts and subcontracts entered into hereunder upon performance of the Work in conformity with the terms of this Order. With regard to the activities undertaken pursuant to this Order, each contractor and subcontractor shall be deemed to be related by contract to the Respondent within the meaning of section 107(b)(3) of CERCLA, 42 U.S.C. § 9607(b)(3). Notwithstanding the terms of any contract, Respondent is responsible for compliance with this Order and for ensuring that their contractors, subcontractors, and agents comply with this Order, and perform any Work in accordance with this Order.

22. Not later than sixty (60) days prior to any transfer of any real property interest in any property included within the Montrose Chemical Site, including, but not limited to the Montrose Plant property, Respondent shall submit a true and correct copy of the transfer documents to EPA, and shall identify the transferee by name, principal business address and effective date of the transfer.

IX. WORK TO BE PERFORMED

23. Respondent shall cooperate with EPA in providing information regarding the Work to the public. At EPA's request and under EPA's direction, Respondent shall participate in the preparation of such information for distribution to the public and may participate in public meetings which may be held or sponsored by EPA to explain the Initial Remedial Design Work. Respondent shall not present technical information, sample results, or technical interpretations to the public independently without prior EPA approval.

24. All aspects of the Initial Remedial Design Work to be performed by Respondent pursuant to this Order shall be under the direction and supervision of a qualified project manager, the selection of which shall be subject to approval by EPA. Not later than five (5) days after the effective date of this Order, Respondent shall notify EPA in writing of the name and qualifications of the project manager, including primary support entities and staff (if any), proposed to be used in carrying out Work under this Order. If at any time Respondent proposes to use a different project manager, Respondent shall notify EPA and shall obtain approval from EPA before the new project manager performs any Work under this Order.

25. EPA will review Respondent's selection of a project manager. If EPA disapproves of the selection of the project manager, Respondent shall submit to EPA, within thirty (30) days after receipt of EPA's disapproval of the project manager previously selected, a list of project managers, including primary support entities and staff, if any, that would be acceptable to Respondent. EPA will thereafter provide written notice to Respondent of the names of the project manager(s) that are acceptable to EPA. Respondent may then select any approved project manager from that list and shall notify EPA of the name of the project manager selected within twenty-one (21) days of EPA's designation of approved project manager(s).

26. The Work conducted by Respondent under this Order shall generally be consistent with EPA's "Remedial Design/Remedial Action (RD/RA) Handbook, OSWER Guidance 9355.0-04B."

27. Respondent shall perform the Work required by the Order as further defined by the attached SOW. In performing the Work required by this Order, Respondent shall follow the requirements and procedures of this Order, of the SOW, and of any EPA approved plans or schedules as required under the SOW to this Order. Any violation of any EPA approved plan or

schedule shall be a violation of this Order. In accordance with Task 2 of the attached SOW to this Order, the Respondent shall submit to EPA a Remedial Design Activity Plan and Schedule (RDAPS) which, upon EPA's approval, shall contain the enforceable schedule for the Work under this Order. The RDAPS shall be submitted to EPA by the Respondent within twenty-one (21) days of the effective date of this Order. The Respondent shall modify the RDAPS in accordance with EPA Comments, if any, and shall submit the modified RDAPS within ten (10) days of receipt of EPA's comments. If the Respondent fails to issue a draft RDAPS per the timeframes in this paragraph, or fails to issue a final RDAPS in accordance with EPA's comments within the timeframes in this paragraph, such failure hall be deemed a violation of this Order and EPA may, at its discretion, unilaterally issue the RDAPS, which shall contain the enforceable schedule for Work under this Order per the SOW.

28. Until EPA issues written approval of any Work performed by Respondent or of submission by Respondent to EPA, such Work or submission will not be deemed to have been approved by EPA.

29. All Work conducted by Respondent under this Order shall be conducted in a manner consistent, as determined by EPA, with the SOW and with the remedial actions selected in the Record of Decision, including but not limited to the Performance Standards and ARARs established in the ROD. EPA has the right to direct, oversee, approve or disapprove of any and all Work performed by Respondent under this Order.

30. Notwithstanding any action by EPA, Respondent remains fully responsible for achievement of the Performance Standards in the Record of Decision. Nothing in this Order, or in the Statement of Work, or in EPA's approval of any Initial Remedial Design Work or any other submission, shall be deemed to constitute a warranty or representation of any kind by EPA

that full performance of the Remedial Design will achieve the Performance Standards set forth in the ROD. Respondent's compliance with submissions approved by EPA does not foreclose EPA from seeking additional work to achieve the applicable Performance Standards.

X. FAILURE TO ATTAIN PERFORMANCE STANDARDS

31. In the event that EPA determines that additional response activities are necessary to meet applicable Performance Standards, ARARs or ROD requirements related to the Initial Remedial Design Work, EPA may require Respondent to perform additional activities. Unless otherwise stated by EPA, within thirty (30) days of receipt of notice from EPA that additional response activities are necessary, Respondent shall submit for approval by EPA a work plan for additional activities. The plan shall conform to the applicable requirements of this Order. Upon EPA's approval of the plan, Respondent shall implement the plan for additional remedial design activities in accordance with the provisions and schedule contained therein.

XI. ENDANGERMENT AND EMERGENCY RESPONSE

32. In the event of any action or occurrence during the performance of the Work which causes or threatens to cause a release of a hazardous substance or which may present an immediate threat to public health or welfare or the environment, Respondent shall immediately take all appropriate actions to prevent, abate, or minimize the threat, and shall immediately notify EPA's Remedial Project Manager (RPM) or, if the RPM is unavailable, EPA's Section Chief. If neither of these EPA employees is available, Respondent shall notify the EPA Emergency Response Section, Region IX. Respondent shall take such action in consultation with EPA's RPM and in accordance with all applicable provisions of this Order, including, but not limited to, the Health and Safety Plan and the RD Contingency Plan. In the event that Respondent fails to

take appropriate response action as required by this Section, and EPA takes that action instead, EPA reserves the right to bring an action under Section 107 of CERCLA, 42 U.S.C. Section 9607, for the recovery of all costs not inconsistent with the NCP. Section XVI of this Order identifies the EPA RPM and Section Chief and describes the procedure for changing these designations. The requirements of this paragraph are in addition to, and do not alter, Respondent's obligation to comply with the requirements of any applicable state or Federal law, including but not limited to the reporting requirements of Section 103(a) of CERCLA, 42 U.S.C. Section 9603(a).

33. Nothing in the preceding paragraph shall be deemed to limit any authority of the United States to take, direct, or order all appropriate action to protect human health and the environment or to prevent, abate, or minimize an actual or threatened release of hazardous substances on, at, or from the Montrose Chemical and/or Del Amo Sites.

XII. EPA REVIEW OF SUBMISSIONS

34. After review of any deliverable, plan, report or other item which is required to be submitted for review and approval pursuant to this Order, EPA may:

A) approve the submission;

B) approve the submission with modifications;

C) issue comments on the submission and require Respondent to re-submit the submission for EPA review and approval;

D) disapprove the submission and direct Respondent to re-submit the document after incorporating EPA's comments; or,

E) disapprove the submission and assume responsibility for performing all or any part of the response action.

35. In the event of approval or approval with modifications by EPA per Paragraph 34 of this Order, Respondent shall proceed to take any action required by the plan, report, or other item, as approved or modified by EPA.

36. Upon receipt of EPA comments on any submission or an EPA notice of disapproval and a request for a modification per Paragraph 34 of this Order, Respondent shall, within fifteen (15) days or such longer time (as specified by EPA in its comment letter or notice of disapproval or request for modification), correct the deficiencies, perform any other required Work and resubmit the plan, report, or other item for EPA review and approval. Notwithstanding the notice of disapproval, or approval with modifications, Respondent shall proceed, at the direction of EPA, to take any action required by any non-deficient portion of the submission.

37. If any submission is disapproved by EPA pursuant to Paragraph 34 of this Order, Respondent shall be deemed to be in violation of this Order.

XIII. PROGRESS REPORTS

38. In addition to the other deliverables set forth in this Order, Respondent shall provide progress reports to EPA with respect to actions and activities undertaken pursuant to this Order. The timing of submittal of progress reports shall be based on the schedule for technical and administrative meetings in accordance with Task 1.1 and 1.2 of the SOW. The Respondent shall issue a progress report at least five (5) calendar days before each scheduled meeting (either technical or administrative). If a meeting date is moved with EPA approval, the submittal deadline for the progress report shall be moved to 5 days before the new date of the meeting. If a technical or administrative meeting is skipped entirely, the the Respondent may skip the

submittal of the progress report, unless submittal of the progress report is otherwise specifically requested by EPA in writing. At a minimum these progress reports shall:

A) describe the actions which have been taken to comply with this Order during the prior month;

B) describe all Work planned for the next three months with schedules relating such Work to the overall project schedule for RD completion; and,

C) describe all problems encountered with the overall implementation of this Order and any anticipated problems, any actual or anticipated delays, and solutions developed and implemented to address any actual or anticipated problems or delays.

XIV. QUALITY ASSURANCE, SAMPLING AND DATA ANALYSIS

39. Respondent shall use quality assurance, quality control, and chain of custody procedures for all samples in accordance with "EPA Requirements for Quality Assurance Project Plans" (March 2001) (EPA QA/R5); "Sampling and Analysis Guidance and Template" (Version 2, R9QA/002, March 2000), and subsequent amendments to such guidance upon notification by EPA to Respondent of such amendment. Amended guidance shall apply only to procedures conducted after EPA notification. Deviations to guidance, identified above, may be made by the Respondent with prior EPA written approval. Prior to commencement of any monitoring or sampling field effort under this Order, Respondent shall submit for EPA approval a Field Sampling Plan for the effort and also submit (or propose applying a previously EPA- approved and applicable) Quality Assurance Project Plan (QAPP) consistent with the requirements and procedures set out in the SOW. Respondent shall ensure that EPA personnel and its authorized representatives are allowed access at reasonable times to all laboratories utilized by Respondent in implementing the Work. In addition, Respondent shall ensure that such laboratories shall analyze all samples submitted pursuant to the QAPP for quality assurance monitoring.

Respondent shall ensure that the laboratories that Respondent utilizes for analysis of samples taken pursuant to this Order perform all analyses according to accepted EPA methods. Accepted EPA methods consist of those methods which are documented in the "Contract Lab Program Statement of Work for Multimedia, Multiconcentration Inorganic Analysis" (Doc. No. ILM05.2) (Sept. 2002) and the "Contract Lab Program Statement of Work for Multimedia, Multiconcentration Organic Analysis" (Doc. No. OLM04.2) (Fall 1999), and any amendments thereto made during the course of implementation of this Order. Respondent shall also ensure that all laboratories Respondent uses for analyses of samples taken pursuant to this Order participate in an EPA or EPA-equivalent QA/QC program. Respondent shall ensure that all field methodologies utilized in collecting samples for subsequent analysis pursuant to this Order will be conducted in accordance with the procedures set forth in the QAPP approved by EPA. Upon the request of EPA, Respondent shall provide copies of laboratory standard operating procedures (SOP), method detection limit studies, and recovery analyses for methods being used. Should respondent identify the need to use modified methods, Respondent shall propose such methods to EPA, provide complete details of modifications proposed and laboratory documentation demonstrating the performance of the modified method, and receive EPA approval prior to using the modified methods.

40. Respondent shall notify EPA not less than fourteen (14) days in advance of any sample collection activity. At the request of EPA, Respondent shall allow EPA or EPA's representative(s) to take split or duplicate samples of any samples collected by Respondent with regard to the Work. In addition, EPA shall have the right to take any additional samples that EPA deems necessary. Respondent shall follow all field work provisions as set forth in the SOW.

41. Respondent shall submit to EPA on a timely basis copies of all sampling results, underlying data packages, QA/QC information and/or any other test results or data obtained or generated by, or on behalf of, Respondent with respect to Work required under this Order.

XV. COMPLIANCE WITH APPLICABLE LAWS

42. All activities by Respondent pursuant to this Order shall be performed in accordance with or designed to comply with the requirements of all Federal and state laws and regulations, including, but not limited to the applicable or relevant and appropriate requirements (ARARs) and other laws identified in the ROD. EPA has determined that the activities contemplated by this Order will be consistent with the National Contingency Plan (NCP).

43. Except as provided in section 121(e) of CERCLA (42 U.S.C. Section 9621(e)) and the NCP, no permit shall be required for any portion of the Work conducted entirely on-site. Where any portion of the Work requires a Federal or state permit or approval, Respondent shall submit timely applications and take all other actions necessary to obtain and to comply with all such permits or approvals.

44. This Order is not, and shall not be construed to be, a permit issued pursuant to any Federal or state statute or regulation.

XVI. REMEDIAL PROJECT MANAGER

45. All communications, whether written or oral, from Respondent to EPA shall be directed to EPA's Remedial Project Manager or, if the RPM is unavailable, to the EPA Section Chief. Respondent shall submit to EPA three copies of all documents, including plans, reports, and

other correspondence, which are developed pursuant to this Order, and shall send these documents by overnight mail, unless otherwise specified by the RPM. Respondent shall also submit one copy of each document to the DTSC representative identified below. At EPA's request, one or more of these copies shall be sent directly to the EPA support contractor for this project.

EPA's Remedial Project Manager is:

Jeff Dhont
Remedial Project Manager
U.S. Environmental Protection Agency
75 Hawthorne Street (SFD 7-1)
San Francisco, CA 94105
(415) 972-3020

EPA's Section Chief is:

Roberta Blank
Chief, Site Cleanup Section 1
U.S. Environmental Protection Agency
75 Hawthorne Street (SFD 7-1)
San Francisco, CA 94105
(415) 972-3169

DTSC's Representative is:

Gloria Conti
Department of Toxics Substances Control, Region 4
5796 Corporate Avenue
Cypress, CA 90630
(714) 484-5496

EPA has the unreviewable right to change its Remedial Project Manager, or Section Chief. If EPA changes its Remedial Project Manager or Section Chief, EPA will inform Respondent in writing of the name, address, and telephone number of the new Remedial Project Manager or Section Chief.

46. EPA's RPM and Section Chief shall have the authority vested in a Remedial Project Manager and On-Scene Coordinator (OSC) by the National Contingency Plan, 40 C.F.R. Part

300. EPA's RPM and/or Section Chief shall have authority, consistent with the National Contingency Plan, to halt or direct changes to any Work required by this Order, and to take any necessary response actions.

XVII. ACCESS TO PROPERTY NOT OWNED BY RESPONDENT

47. If property subject to or affected by the Work is owned in whole or in part by one or more parties other than Respondent, Respondent shall obtain, or use its best efforts to obtain, access agreements from the present owner(s). Such agreements shall provide access for EPA, its contractors or designees, the state and its contractors, and Respondent or Respondent's authorized representatives and contractors, and such agreements shall specify that Respondent is not EPA's representative with respect to any liability associated with Work conducted by Respondent at the property. Respondent shall hold EPA and its officials, agents, employees, contractors, subcontractors, or representatives harmless for or from any and all claims or causes of action or other costs incurred by EPA, including but not limited to attorneys fees and other expenses of litigation and settlement arising from or on account of acts or omissions of Respondent, its officers, directors, employees, agents, contractors, subcontractors, and any persons acting on their behalf or under their control, in carrying out activities pursuant to this Order. Copies of such access agreements shall be provided to EPA prior to Respondent's initiation of field activities. Respondent's best efforts to obtain property access shall include providing reasonable compensation to any property owner. If access agreements are not obtained by Respondent, Respondent shall immediately notify EPA of its failure to obtain access. Subject to EPA's non-reviewable discretion, EPA may use its legal authorities to obtain access for the Respondent, may perform those response actions with EPA contractors at the property in question, or may terminate the Order if Respondent cannot obtain access agreements. If EPA performs those tasks or activities with contractors and does not terminate the Order, Respondent

shall perform all other activities not requiring access to that property. Respondent shall integrate the results of any such tasks undertaken by EPA into their reports and deliverables. EPA reserves the right to bring an action against Respondent under section 107 of CERCLA, 42 U.S.C. § 9607, for recovery of all response costs (including attorney fees) incurred by EPA to obtain access for Respondent and to perform response actions at the property.

XVIII. ACCESS AND DATA/DOCUMENT AVAILABILITY

48. Respondent shall allow EPA and its authorized representatives and contractors to enter and freely move about all property subject to or affected by the Work under this Order for the purposes of inspecting conditions, activities, the results of activities, or records related to the Work; of reviewing the progress of the Respondent in carrying out the terms of this Order; of conducting tests as EPA or its authorized representatives or contractors deem necessary; of using a camera, sound recording device or other documentary type equipment; and for the purpose of verifying the data submitted to EPA by Respondent. Respondent shall allow EPA and its authorized representatives to, on request, copy all records, files, photographs, documents, sampling and monitoring data, and other writings related to Work undertaken in carrying out this Order. Nothing herein shall be interpreted as limiting or affecting EPA's right of entry or inspection authority under Federal law.

49. Respondent may assert a claim of business confidentiality covering part or all of the information submitted to EPA pursuant to the terms of this Order under 40 C.F.R. § 2.203, provided such claim is not inconsistent with section 104(e)(7) of CERCLA, 42 U.S.C. § 9604(e)(7) or other provisions of law. This claim shall be asserted in the manner described by 40 C.F.R. § 2.203(b) and substantiated by Respondent at the time the claim is made. Information determined to be confidential by EPA will be given the protection specified in 40 C.F.R. Part 2.

If no such claim accompanies the information when it is submitted to EPA, it may be made available to the public by EPA or the state without further notice to the Respondent. Respondent shall not assert confidentiality claims with respect to any data related to conditions at the Sites, sampling, or monitoring.

50. Respondent shall maintain for the period during which this Order is in effect, an index of documents that Respondent claims contain confidential business information. The index shall contain, for each document, the date, author, addressee, and subject of the document. Upon written request from EPA, Respondent shall submit a copy of the index to EPA.

51. Respondent shall, fourteen days prior to any off-site shipment of hazardous substances from the Sites to a waste management facility, provide written notification to the appropriate state environmental official in the receiving state, and to EPA's Project Coordinator, of such shipment of hazardous substances. However, this notification requirement shall not apply to any samples sent off-site for laboratory analysis. The notification shall be in writing, and shall include the following information, where available:

A) the name and location of the facility to which the hazardous substances are to be shipped;

B) the type, characteristics and quantity of the hazardous substances to be shipped;

C) the expected schedule for the shipment of the hazardous substances;

D) the method of transportation; and,

E) the planned disposition of the hazardous substances (e.g. treatment, storage, disposal).

Respondent shall notify the receiving state of major changes in the shipment plan, such as decision to ship the hazardous substances to another facility within the same state, or to a facility in another state. Any off-site shipment of hazardous substances shall be accomplished by Respondent in a manner consistent with all applicable state and federal law, including but not

limited to 42 U.S.C. Section 9621(d)(3) and implementing regulations. If EPA believes that any such shipment is or will be made in violation of any applicable state or Federal law, EPA may, under the authority of this Order, direct Respondent to stop or cease the shipment until Respondent demonstrates to the satisfaction of EPA that Respondent has come into full compliance with the applicable legal requirement. The provisions of this paragraph do not relieve Respondent of the responsibility to comply with all other applicable state or federal law regarding the transportation, storage, treatment or disposal of materials shipped off-site by Respondent.

XIX. DELAY IN PERFORMANCE

52. Any delay in performance of this Order that, in EPA's judgment, is not properly justified by Respondent, shall be considered a violation of this Order. Any delay in performance of this Order shall not affect Respondent's obligations to fully perform all obligations under the terms and conditions of this Order.

53. Respondent shall notify EPA of any delay or anticipated delay in performing any requirement of this Order. Such notification shall be made by telephone to EPA's RPM or Section Chief within forty eight (48) hours after Respondent first knew or should have known that a delay might occur. Respondent shall adopt all reasonable measures to avoid or minimize any such delay. Within five (5) business days after notifying EPA by telephone, Respondent shall provide written notification fully describing the nature of the delay, any justification for delay, any reason why Respondent should not be held strictly accountable for failing to comply with any relevant requirements of this Order, the measures planned and taken to minimize the delay, and a schedule for implementing the measures that will be taken to mitigate the effect of

the delay. Increased costs associated with implementation of the activities called for in this Order is not a justification for any delay in performance.

XX. MODIFICATIONS

54. This Order and attached SOW may be amended or modified by EPA. Such amendment or modification shall be in writing and shall be signed by the Chief or Acting Chief, Site Cleanup Branch, Superfund Division, U.S. EPA Region IX.

55. The EPA RPM, or in the RPM's absence, the EPA Section Chief, may agree to changes in any approved plan or schedule. Any such changes must be requested in writing by Respondent and be approved in writing by the EPA RPM, or, in the RPM's absence, by the EPA Section Chief.

56. All modification requests submitted pursuant to this Section shall be sent by certified mail, return receipt requested, and addressed to the EPA RPM.

57. No informal advice, guidance, suggestions or comments by EPA or EPA's representatives regarding reports, plans, specifications, schedules, or any other writing submitted by Respondent shall relieve Respondent of its obligations to obtain such formal approval as may be required by this Order, and its obligations to comply with all requirements of this Order.

XXI. ASSURANCE OF ABILITY TO PERFORM WORK

58. At least seven (7) days prior to commencing any Work pursuant to this Order, Respondent shall submit to EPA a certification that Respondent or its contractors and

subcontractors have adequate insurance coverage or have indemnification for liabilities for injuries or damages to persons or property which may result from the activities to be conducted by or on behalf of Respondent pursuant to this Order. Respondent shall ensure that such insurance or indemnification is maintained for the duration of the Work required by this Order.

XXII. EPA NOT LIABLE

59. EPA, by issuance of this Order, assumes no liability for any injuries or damages to persons or property resulting from acts or omissions by Respondent, or its directors, officers, employees, agents, representatives, successors, assigns, contractors, or consultants in carrying out any action or activity pursuant to this Order. EPA shall not be deemed a party to any contract entered into by Respondent or its directors, officers, employees, agents, successors, assigns, contractors, or consultants in carrying out any action or activity pursuant to this Order.

XXIII. ENFORCEMENT AND RESERVATIONS

60. EPA reserves the right to bring an action against Respondent under Section 107 of CERCLA, 42 U.S.C. § 9607, for recovery of any response costs incurred by EPA related to this Order and not reimbursed by Respondent. This reservation shall include but not be limited to past, direct, indirect, and oversight costs, as well as the costs of compiling the cost documentation to support any cost demand, and accrued interest for all costs as provided in section 107(a) of CERCLA, 42 U.S.C. Section 9607(a).

61. Notwithstanding any other provision of this Order, at any time, EPA may perform its own studies, or elect to complete the Work (or any portion of the Work) pursuant to the its

authorities under CERCLA and the NCP, and EPA may seek reimbursement from Respondent for costs, or seek any other appropriate relief.

62. Nothing in this Order shall preclude EPA from taking any additional enforcement actions, including modification of this Order or issuance of additional Orders, and/or selection of additional remedial or removal actions as EPA may deem necessary, or from requiring Respondent in the future to perform additional activities pursuant to CERCLA or any other applicable law. EPA reserves the right to bring an action against Respondent under section 107 of CERCLA, 42 U.S.C. § 9607, for recovery of the costs of any such additional actions undertaken by EPA.

63. Notwithstanding any provision of this Order, the United States hereby retains all of its information gathering, inspection and enforcement authorities and rights under CERCLA, RCRA and any other applicable statutes or regulations with respect to the Montrose Plant property or the groundwater operable unit at the Sites..

64. EPA reserves the right to seek enforcement of this Order and to collect civil penalties under section 106(b) of CERCLA, 42 U.S.C. § 9606(b), of not more than $25,000 for each day in which Respondent willfully violates, or fails or refuses to comply with this Order without sufficient cause. In addition, failure to properly perform the Work required under this Order, or any portion hereof, without sufficient cause, may result in liability under section 107(c)(3) of CERCLA, 42 U.S.C. § 9607(c)(3), for punitive damages in an amount at least equal to, and not more than three times the amount of any costs incurred by EPA as a result of such failure to take proper action.

65. Nothing in this Order shall constitute or be construed as a release from any claim, cause of action or demand in law or equity against any person for any liability it may have arising out of or relating in any way to the Sites.

66. If a court issues an order that invalidates any provision of this Order or finds that Respondent has sufficient cause not to comply with one or more provisions of this Order, Respondent shall remain bound to comply with all provisions of this Order not invalidated by the court's order.

XXIV. DOCUMENT SUBMISSIONS

67. Upon request by EPA, Respondent must submit to EPA all technical documents and other information (including but not limited to laboratory data packages, field documentation, electronic and printed copies of data and data interpretation, printed and electronic copies of draft technical documents) produced by Respondent in complying with this Order for possible inclusion in the EPA site file or administrative record file.

XXV. OPPORTUNITY TO CONFER

68. Respondent may, within seven (7) days after the date on which this Order is signed, request a conference to discuss this Order with EPA at its Region IX offices located at 75 Hawthorne Street in San Francisco, California. If requested, the conference shall occur on May 15, 2003 at 1 pm at 75 Hawthorne Street, San Francisco, California. Only one conference will be held with Respondent with respect to this Order.

69. The purpose and scope of the conference shall be limited to issues involving the implementation of the Work required by this Order and the extent to which Respondent intends to comply with this Order. This conference is not an evidentiary hearing, and does not constitute a proceeding to challenge this Order. It does not give Respondent a right to seek review of this Order, or to seek resolution of potential liability, and no official stenographic record of the conference will be made. At any conference held pursuant to Respondent's request, Respondent may appear in person or may be represented by an attorney or other representative. Regardless of whether a conference is held, Respondent may submit any information, arguments or comments in writing to EPA within two (2) business days following the conference, or within seven (7) business days after the Order is signed if no conference is requested.

70. Requests for a conference must be by telephone followed by written confirmation mailed that day to: John Lyons, Assistant Regional Counsel, Mailcode ORC3, US EPA Region IX, 75 Hawthorne Street, San Francisco, California 94105.

XXVI. EFFECTIVE DATE AND COMPUTATION OF TIME

71. This Order shall be effective fourteen (14) days after the Order is signed by the Acting Chief or Chief, Site Cleanup Branch, Superfund Division, U.S. EPA Region IX. All times for performance of ordered activities shall be calculated from this effective date.

72. This Order shall remain in effect until the date that Respondent receives from EPA written notice that all Work required by this Order has been completed, or the date that the

District Court approves and enters a Consent Decree between EPA and Respondent regarding groundwater remedial design work with respect to the Sites, whichever occurs first.

So Ordered, this 8th day of MAY, 2003.

BY: _____

Elizabeth Adams
Acting Chief, Site Cleanup Branch
Superfund Division
U.S. Environmental Protection Agency, Region IX

ATTACHMENTS

Attachment 1: Record of Decision

Attachment 2: Statement of Work

Enforceable
Statement of Work for
Initial Remedial Design Work
Dual Site Groundwater Operable Unit
Montrose Chemical and Del Amo Superfund Sites

Context and Purpose

On March 30, 1999, EPA issued the *Record of Decision for Dual Site Groundwater Operable Unit; Montrose Chemical and Del Amo Superfund Sites* (2 volumes) (hereafter, "**ROD**"). The ROD formally selected the remedial action for cleanup of the dissolved phase contamination and containment of groundwater surrounding non-aqueous phase liquids (NAPL) at both the Montrose Chemical and Del Amo Superfund Sites in Los Angeles, California. The ROD presents EPA's basis for selecting the remedial action, and specifies the standards, requirements, performance standards, and other specifications that shall be attained during the design and implementation of the remedial action selected by the ROD.

After issuance of the ROD, the Superfund process proceeds to ***remedial design (RD)*** in which the remedy selected by the ROD is designed, ***remedial action (RA)*** in which the remedy is constructed and implemented, and ***operation and maintenance (O&M)***, in which the remedy, once fully operational, is operated and maintained for the duration of the remedial action. This SOW pertains to the RD portion of this work for the remedy selected by the ROD. The remedy selected by the ROD is hereafter in this SOW referred to as the Dual Site Groundwater Operable Unit Remedy, and the remedial design for the remedy is referred to as the "remedial design" or the "design" unless otherwise specified.

This Statement of Work (SOW) is an attachment to a unilateral administrative order (UAO) issued by EPA to Montrose Chemical Corporation of California, hereinafter "Respondent," with respect to remedial design work for the Dual Site Groundwater Operable Unit Remedy. The work under this SOW, as required by the UAO, does *not* address all work that will be required to complete the Dual Site Groundwater Remedial Design. Rather, the work under this SOW is intended to be a subset of the overall design work. EPA intends to pursue additional enforcement instruments to secure the balance of the design work. For this reason, certain logical tasks, (e.g. field work corresponding to a sampling plan that is required in this SOW) may not appear in this SOW.

The purpose of this SOW is to define the technical work that shall be performed pursuant to the UAO. This SOW is dependent on the UAO and nothing in this SOW shall supersede the requirements and provisions of the UAO. Likewise, the Dual Site Groundwater Operable Unit

Remedy RD work detailed by this SOW is requisite and intended as a means of meeting the specifications, performance standards, requirements and provisions of the ROD. Therefore, nothing in this SOW shall supersede or be construed as relieving the Respondent of meeting the provisions of the ROD and it shall be the objective of all remedial design work to meet all ROD provisions.

Terms and Definitions

Terms used in the UAO have the same meaning when used herein unless otherwise specifically stated otherwise.

Terms used by the ROD have the same meaning when used herein, unless otherwise explicitly stated otherwise. These terms include but are not limited to: *joint site, in-situ groundwater standard (ISGS), containment zone, chlorobenzene plume, benzene plume, TCE plume, TCE, pCBSA plume, NAPL, hydraulic extraction, reinjection, technical impracticability, technical impracticability waiver, Upper Bellflower, Middle Bellflower B Sand (MBFB Sand), Middle Bellflower C Sand (MBFC Sand), Lower Bellflower Aquitard, Gage Aquifer, Gage-Lynwood Aquitard, Lynwood Aquifer, Lynwood-Silverado Aquitard, and Silverado Aquifer.*

As discussed in Section 7.2 of the ROD, the term "plume" has a specialized use in the ROD. The formal definition of each plume is provided in Section 13, Provision 3 of the ROD. "Plume" does not always refer to the entire distribution of a contaminant in groundwater, but rather refers to a particular portion of the distribution which espouses a certain set of physical characteristics and will respond to one set of remedial actions and objectives (See ROD Section 7). The term "plume" applies to all hydrostratigraphic units within which a referenced plume occurs unless otherwise stated.

Unless otherwise specified, the term "wellfield" herein shall refer to the particular number and spatial distribution of groundwater extraction and injection wells that will be used to execute the requirements of the remedy as selected by the ROD. The wellfield will be determined by the remedial design. Unless otherwise specified, the term "well rate distribution" shall refer to the particular rates at which each well in the well field will extract or inject groundwater -- the distribution of the total pump rate among the wells within the wellfield. The pump rate distribution will be determined by the remedial design. Both wellfield and well rate distribution may change over time, with EPA approval, as the remedy is implemented.

Coordination and Consultation on EPA Work Items

The remedial design for the Dual Site Groundwater Operable Unit involves two Superfund Sites and is being implemented under more than one enforcement instrument with responding parties from each of the sites. In order to ensure a unified and coordinated response, some of the work

envisioned under this SOW will be performed by EPA (hereinafter identified in this SOW, "EPA Work Items.") For the EPA Work Items, various coordinating activities apply to the Respondent. The primary EPA Work Items are performance of the groundwater modeling effort and development and updating of the Groundwater Monitoring and Compliance Plan.

EPA plans to consult and coordinate with the Respondent on EPA Work Items. This will include receiving input from the Respondent and sharing drafts of work item documents with the Respondent for discussion and consultation prior to their finalization. Discussions between EPA and the Respondent on EPA Work Items will take place, as necessary, in the meetings between EPA and the Respondent that are required under General Requirements, Task 1 of this SOW, or at other times as appropriate and mutually agreeable to EPA and Respondent. In particular, EPA plans to receive input from the Respondent on an ongoing basis during the modeling development phase.

GENERAL REQUIREMENTS

1 Meetings

Regular meetings between EPA and Respondent shall be held in order to ensure communication, resolve issues, monitor and ensure progress, and allow for EPA to oversee the work of the Respondent. Meetings will be held at a mutually agreeable time and location to both EPA and Respondent. Meetings may be held in person or by conference telephone call per the mutual agreement of the Respondent and EPA.

1.1 Technical Meetings

At least once every other calendar month after the effective date of the UAO, unless otherwise mutually agreed in writing by EPA, a technical meeting shall be held to discuss and resolve technical matters related to the work under this SOW. The Respondent shall make available at the meeting consultants working on matters related to the technical activities to be discussed at the meeting, unless otherwise agreed by EPA in advance of the meeting. The meeting shall also serve the purpose of assisting EPA in overseeing the work. Accordingly, at the request of EPA the Respondent shall provide to EPA pertinent interim work such as maps, lists, diagrams, descriptions, modeling input or output, documents, etc. as may exist and apply to the work at the time of the meeting.

EPA may request, and the Respondent shall attend and participate in, special technical meetings at times other the regular technical meeting when EPA determines such a meeting is needed given the nature of the current work.

If the Respondent intends to have an attorney attend a technical meeting, it shall provide EPA with notice of such intention at least 2 days prior to the meeting. This notice may be given by telephone or electronic mail. The purpose of this provision is to ensure EPA has the opportunity to arrange for legal representation it may deem appropriate. EPA intends to follow the same approach with respect to the Respondent.

1.2 Administrative Progress Meetings

At least once per calendar quarter (three-month-period), unless otherwise agreed in writing by EPA, an administrative progress meeting shall be held to discuss the overall progress of the remedial design; to monitor, coordinate and resolve schedule concerns; and to discuss any matters related to compliance with, and enforcement of, the UAO. Technical personnel such as consultants may or may not be present at such meetings, depending on the meeting agenda.

In addition to the regular administrative progress meetings, EPA may request, and the Respondent shall attend and participate in a special administrative progress meeting at times other than the regular administrative progress meetings, when EPA determines such a meeting is needed given the nature of the current work.

If the Respondent intends to have an attorney attend an administrative meeting, it shall provide EPA with notice of such intention at least 2 days prior to the meeting. This notice may be given by telephone. The purpose of this provision is to ensure EPA has the opportunity to arrange for legal representation it may deem appropriate. EPA intends to follow the same approach with respect to the Respondent.

2 Modification to Documents and Addressing EPA Comments

EPA shall have approval authority over all documents submitted under this SOW. The Respondent shall provide EPA with the data, analysis, and consultation necessary to review the documents and verify the statements and conclusions in the documents.

EPA shall issue to the Respondent EPA's comments on documents submitted pursuant to this SOW, if any. Unless explicitly stated otherwise, each comment shall represent a requested change to the document in order for EPA to find the document acceptable. If Respondent believes that any of EPA's comments are not clear or if Respondent does not agree with the comment, Respondent may confer with EPA's Remedial Project Manager. Unless such comments are withdrawn, the Respondent shall address all EPA comments by making the requested change to the next draft of the document. The Respondent may, at its discretion (and shall, at the request of EPA) issue a "Response to Comments" document which describes how the Respondent has addressed the comment and states any other background information that EPA should know about the response. However, issuing such a document does not relieve the Respondent of its responsibility to modify the document in accordance with the comment. Comments shall not be deemed addressed by the Respondent until EPA certifies in writing that the comment has been addressed in the document to EPA's satisfaction, or that EPA withdraws the comment based on discussion with the Respondent. If Respondent does not agree with conclusions drawn in an EPA comment requiring that the Respondent modify the text of a deliverable to reflect such conclusion, Respondent may write "EPA has concluded that..." in the text in association with that conclusion. Prior to doing so, however, the Respondent shall discuss with EPA on the disagreement and try in good faith to resolve the disagreement.

The provisions of Section 2 apply to all deliverables submitted to EPA by the Respondent.

3 Additional Work Provision

Every reasonable effort has been made to make this SOW inclusive of the work that will be necessary. However, in designing remedial systems, unforeseen events and circumstances can occur. When EPA determines that additional work not foreseen by this SOW is necessary in order for the remedial design work under this SOW to be compliant and consistent with the ROD, CERCLA, the NCP, EPA Guidances and Policy, ARARs, or any independently applicable laws and regulations, then EPA shall identify the work in writing to the Respondent. The Respondent shall perform the work and create to EPA's satisfaction any additional planning documents that may be needed in order to complete the work. These shall be modified by the Respondent in accordance with EPA's comments, if any.

4 Data Management Plan

The Respondent shall develop and submit to EPA a Data Management Plan to address all data acquired during the remedial design and remedial action process. The Respondent shall modify this plan in accordance with EPA comments, if any. The Respondent shall amend this plan as necessary to address new types of data as they become available. The Data Management Plan shall present the methods for tracking, storing, querying, and retrieving data. The plan shall also identify the software to be used, minimum data requirements, data format and other output format options, and backup data management. The Data Management Plan shall address electronic as well as paper data and information.

The Respondent shall cooperate with EPA and as necessary, other parties responding to EPA enforcement orders or consent decrees for the Dual Site Groundwater Operable Unit Remedial Design, to develop a database format and database in which data gathered for the remedial design will be shared commonly among the parties. Additional data may be managed in its database by the Respondent that is not managed by other respondents; however, groundwater quality and water level data, geochemical data, well construction data, aquifer test data and derived values (such as Transmissivity or Storativity) will be stored in a common fashion. EPA will review the proposal by the Respondent for this common database within the Data Management Plan and it shall be subject to EPA approval.

Once the Data Management Plan is approved by EPA, the Respondent shall manage all data in accordance with the Data Management Plan unless otherwise approved by EPA.

5 Notice of Deficiencies and Stop Work Orders

If EPA determines that the Respondent is conducting work under this SOW in a manner that:

- Is not in accordance with the ROD, CERCLA, or approved plans under this SOW; or
- May result in data that is unusable or insufficient for the purposes of the remedial design; or
- May result in data or findings that are biased or not objective; or
- May result in a release of hazardous substances to the environment; or
- May result in making cleanup of hazardous substance contamination more costly, difficult, or time consuming; or
- May result in the destruction or damage to evidence of a release of hazardous substances; or
- May threaten the effectiveness or protectiveness of the remedial action; or
- Is not safe for workers or the public; or
- May result in serious concerns among the public such that more time is necessary for EPA to manage community relations issues; or
- May result in property damage or violate property rights; or
- May violate laws or regulations of the United States, the State of California, or local governmental entities, then

EPA may issue a Notice of Deficiencies to the Respondent by EMAIL, facsimile, and/or written letter. The Respondent shall meet with EPA as soon as possible to discuss the EPA-identified deficiencies in the work. EPA may withdraw its identification of some or all of the deficiencies following consultation with the Respondent. The Respondent shall then correct all remaining identified deficiencies and demonstrate those corrections to EPA.

EPA also may, at its discretion, issue a Notice of Deficiencies and Stop Work Order in such instances. In such an event, after consultation with the Respondent, the Respondent shall stop the particular work cited in the Order as soon as possible and secure all field equipment and activities in such a way as to ensure interim public and worker safety. The Respondent shall then meet with EPA as soon as possible to discuss the deficiencies in the work and reasons for the stop work order. The Respondent shall then correct all identified deficiencies and demonstrate those corrections to EPA. The Respondent shall not resume work without EPA approval.

This provision notwithstanding, the Respondent shall not be relieved of its responsibility to comply with laws and shall remain fully liable for its actions or failure to act in any civil case related to work performed under this UAO.

6 Field Work Provisions

In addition to any specific provisions below which may apply, the following general provisions shall apply to any field work performed by the Respondent:

The Respondent shall not initiate field work on any particular subtask or task in this SOW without written notice by EPA to proceed. This notice may be given by letter, EMAIL, or facsimile. Respondent shall perform all field work in accordance with EPA-approved Field Sample Plans, Quality Assurance Plans, and Work Plans, as may apply to the work, unless otherwise approved by EPA.

The Respondent shall make all field activities and non-privileged documentation available for oversight by EPA, its contractors, and assigns, at all times. This may include, but not be limited to, preparatory activities and mobilization, demobilization activities, safety and "tailgate" meetings, treatment and disposal activities, daily and long-term equipment calibration and setup, borehole and well bore drilling, well development, disposal of investigation-derived-waste, sample collection, boring installation, field laboratory work, field logs, chain-of-custody, sample identification and documentation, sample handling, sample packaging and shipment, measurements, observations, analytical data, mobile laboratory setup or operation, protection of public safety, and any and all activities related to determining compliance with the ROD, the approved plans, and applicable regulation. The Respondent shall provide EPA with at least 5 day notice of initiating work in the field so that EPA can ensure that a field oversight representative will be available. Respondent will make its best effort to provide EPA with the field work schedule for as many days in advance as is available, and to inform EPA when down time in the field is expected.

Respondent shall have each member of the field team read the approved health and safety plan and sign a document declaring that they have read it. Respondent shall also have each member of the field team that will be collecting and siting samples, or directing well installation activities, sign a document declaring that they have read any approved work plans, field sampling plans, health-and-safety plans, and any other field planning documents related to the effort. Respondent shall provide this document to EPA. Respondent shall have a copy of any approved work plan document, FSP and QAPP, and the Health and Safety plan available in the field and the person in charge of the field effort shall be personally responsible for their continued presence and use at the site.

7 Analysis of Data Provisions

Respondent shall perform all laboratory analysis of environmental sampling data required to fulfill work under this SOW at a laboratory approved by EPA. If the Quality Assurance Project Plan (QAPP) designates a particular laboratory, then EPA's approval of the QAPP shall designate its approval of the laboratory. However, if the laboratory changes and/or if the QAPP does not designate a laboratory, then the Respondent shall obtain EPA's approval on the use of the proposed laboratory before proceeding.

Respondent shall provide to EPA any laboratory standard procedures, method detection limit studies, and laboratory documentation that is requested by EPA pertaining to analyses conducted or to be conducted in response to this SOW. Respondent shall arrange for and oversee the laboratory's performance of site-specific method detection limit studies and other method verification studies as determined necessary to complete the analytical work under this SOW. Such studies shall generally not be required for unmodified standard EPA procedures, but may be necessary for modified or special procedures.

Respondent shall perform reasonable data validation of the laboratory performance and make data validation reports available for EPA review. Respondent shall ensure that sufficient and appropriate laboratory documentation is maintained, per the approved Quality Assurance Plan, to allow for a complete and independent validation of data by EPA. Respondent shall make such documentation available upon request by EPA, and shall allow EPA to speak with the chemist of the laboratory to answer questions which may arise regarding data or data validation.

8 Preservation of Documents

Respondent shall retain all non-privileged documentation related to the planning, field and sampling work, field notes and logs, analytical work, analytical results, data and databases, and electronic files associated with the work under this SOW for a period of no less than five years from EPA's determination that the work under this SOW is complete, unless otherwise approved by EPA. The Respondent shall make available to EPA any of these documents upon request and allow EPA to copy the documents before any are destroyed, and shall provide EPA at least 30 days notice of Respondent's intention to destroy the documents or data after the 5-year period has elapsed.

9 Numbering and Combining Deliverables

Each deliverable to be developed and issued under this SOW shall be issued a unique code number called the *Deliverable Identification Number*, or *DIN*. The DIN for each deliverable appears in the table of deliverables at the end of this SOW (Attachment 1). The Respondent shall include the applicable DIN on the cover of each deliverable along with the title. The presence of the DIN shall signify that the document submitted is intended to serve the precise purpose and requirements identified in this SOW for that document.

The Respondent may find, for reasons of timing or otherwise, that some of the deliverables identified in this SOW may be more efficiently issued under a single cover (one document) rather than two or more as identified in this SOW. The Respondent may petition EPA to permit the combining of certain deliverables, and with EPA's approval, may proceed to combine them according to the petition as modified by EPA's approval. In such a case, the Respondent shall list the applicable names and DINs of all combined deliverables on the title page of the combined report. EPA may provide approval of such a proposal in writing or by EMAIL.

DINs shall begin with the prefix "DSGWRD 0926/36" which refers to "Dual Site Groundwater Remedial Design" at sites 0926 and 0936, which are EPA's internal site identifiers for the Montrose Chemical and Del Amo Superfund Sites. The prefix will be followed with the sequence number for the deliverable, indicated in bold text. As an example, a DIN may be:

DSGWRD 0926/36 - **001**.

PART I. PRE-DESIGN WORK

Pre-design work shall be performed to provide the basic supporting information and data necessary for remedial design consistent with the ROD and approved by EPA.

1 Data Acquisition

ROD Section 13 Provisions 4.01 - 4.04 require that certain data be acquired to support the remedial design process.

1.1 Data Acquisition To Define TCE Plume Distribution and Sources

Section 13 Provision 4.01 of the ROD requires that additional characterization of the TCE plume take place for remedial design purposes. While sufficient information existed for selection of the remedial action, designing the wellfield will depend on more specific information about the TCE plume and the sources of TCE contamination.

1.1.1 Work Plan for TCE Plume Data Acquisition

Respondent shall develop and submit to EPA a Work Plan for TCE Plume Data Acquisition [DIN Suffix 002] (TCE refers to trichloroethylene and the family of chlorinated solvents as defined in the ROD) with the objective of obtaining sufficient data to characterize the contribution of TCE from sources upgradient of the Montrose plant property that may have an impact on the remedial design or remedial action. This work plan shall include the following major components:

- A description of existing data on the TCE plume distribution and potential sources;
- An identification of the gaps in the current database with respect to the distribution and potential sources of the TCE plume as context for the acquisition of additional data on these items;
- The identification and rationale for the number and locations of monitoring wells to be installed to meet the ROD requirements with respect to the TCE plume;
- Identification of the property owners at the locations of the proposed wells and any anticipated issues with short- and long-term property access;
- A complete description, including diagrams, of proposed well construction details and specifications; drilling method and all drilling equipment; all pertinent construction materials; measurements of borehole, casing, and annular space; depths of screened and blank casing; proposed pumps, transducers, and any other dedicated or temporary

downhole equipment; methods to be used to determine depths and elevations; wellhead and well vault construction detail and specifications; and any other related details – Construction diagrams shall be provided relative to the stratigraphy encountered;

- A complete description of proposed well development procedures;
- A complete description of treatment and/or disposal of development water, drilling muds, and any other potentially contaminated media;
- The groundwater sampling procedures and chemical and physical parameters to be included in the sample analyses of the new wells, pending incorporation into the overall monitoring plan;
- A Field Sampling Plan (FSP). This plan shall include the detailed sampling procedures for collecting samples during the TCE investigation that meet the data quality objectives (DQOs). The FSP shall include sampling objectives; sample locations and frequency; sampling equipment and procedures; sample handling and analysis; sample preservation, decontamination, and a breakdown of samples to be analyzed through the Contract Laboratory Program (CLP) and through other sources, as well as the justification for those decisions. The FSP shall be written so that a field sampling team unfamiliar with the site would be able to gather the samples and field information required. The FSP shall meet applicable EPA guidances. ***With EPA approval, this FSP may be combined in the same document with FSP information from other tasks in this SOW that require a FSP.***
- A Quality Assurance Project Plan (QAPP). The QAPP shall describe the project objectives and organization, functional activities, and data quality objectives, quality assurance/quality control (QA/QC) protocols that shall be used to achieve the desired data quality objectives DQOs. The QAPP shall meet applicable EPA guidances. ***With EPA approval, this QAPP may be combined in the same document with QAPP information from other tasks in this SOW that require a QAPP.***
- A site-specific health and safety plan [DIN Suffix 003] shall be prepared with provisions for the data-acquisition work that specifies employee training, protective equipment, medical surveillance requirements, standard operating procedures, and a contingency plan in accordance with 40 CFR 300.150 of the NCP and 29 CFR 1910.120 1(1) and (1)(2). ***With EPA approval, a single comprehensive Health and Safety Plan that is inclusive for all Remedial Design may be created and modified as necessary as more field activities are performed.***
- A schedule of completion shall be submitted to EPA that shall present a list of the major tasks associated with this data acquisition, along with the start and end dates of each task.

All of the above plans and documents shall be subject to EPA approval. Respondent shall modify the documents in accordance with EPA comments, if any.

1.1.2 Field Work for TCE Plume Data Acquisition

The Respondent shall implement the field work put forth in the approved Work Plan and FSP/QAPP according to the schedule put forth in the approved schedule of completion. Field work shall be conducted in accordance with the *Field Work Provisions* in the General Requirements section of this SOW. If the Respondent believes that the schedule will have to change, the Respondent shall contact EPA and request an approval of a change to the schedule of completion. EPA shall then determine whether to approve the requested change. The Respondent shall provide EPA with sufficient notice of, and information about, the field work for EPA to develop outreach materials to the public so that they are aware of the TCE Data Acquisition activities.

1.1.3 Completion Report for TCE Plume Data Acquisition

The Respondent shall issue a Completion report for TCE Data Acquisition [DIN Suffix 004] gathering efforts completed under this task. Respondent shall modify the draft Completion Report for TCE Plume Data Acquisition according to EPA comments, if any. ***With EPA approval, Respondent may combine in a single document the contents of this completion report with those of other completion reports required under Section 1 of this SOW.*** The Completion Report shall include:

Well Completion Documentation, including:

- Exact well location with coordinates and map relative to surrounding area;
- Well construction and materials detail;
- Diagrams of well depths, casing, annular spacing, packing, screened interval;
- Initial water levels and water quality data;
- Property ownership and property access issues, including but not limited to permits and easements; and
- The objectives of the investigation;
- A description of the field activities documenting actual drilling, and sampling and analysis methods and procedures and how any of these may have differed from the pCBSA Data Acquisition Plan;
- A summary of the existing data on the distribution of the TCE plume in the vicinity of the former Montrose plant property;
- Results of any sampling or measurements collected as part of this RD task;

- Geologic logs from well installations;
- Graphics depicting:
  - locations of sampling points
  - hydrostratigraphic cross sections
- Any other information necessary to document the completion of the wells.

1.2 Data Acquisition to Delineate the pCBSA Plume

Section 13 Provision 4.04 provides that the extent of the contaminant para-chlorobenzene sulfonic acid, or pCBSA, downgradient and side-gradient from the Montrose property shall be determined. In addressing this provision, Respondent shall sample existing monitoring wells, or install and sample additional monitoring wells, as determined necessary by EPA, after consultation with the Respondent. Wells shall be installed and sampled in accordance with this task. Determining the exact contour line where pCBSA concentrations become non-detect shall not be necessary. However, the Respondent's proposal and work under this task shall allow EPA:

- to establish a reasonable boundary within which the Montrose pCBSA contamination is located, for each of the pCBSA-contaminated hydostratigraphic units,
- to track future movements of pCBSA in the side and down-gradient direction,
- to be alerted to pCBSA that may be moving in the direction of water supply wells, and
- to reasonably evaluate the proximity of the pCBSA plume to water supply wells.

1.2.1 Work Plan: Well Installation, FSP and QAPP for pCBSA Data Acquisition

Respondent shall develop and submit to EPA a Work Plan for pCBSA Data Acquisition [DIN Suffix 007] with the objective of obtaining sufficient data to establish the side- and down-gradient extent of the pCBSA plume and form the basis for an effective monitoring plan for pCBSA in accordance with the ROD. The Work Plan shall follow the guidelines presented in Section 1.2 of this SOW. This work plan shall include the following major components:

- A description of existing data on the pCBSA distribution;
- An identification of the gaps in the current database with respect to the distribution of pCBSA as context for the acquisition of additional data;
- The identification and rationale for the number and locations of monitoring wells to be installed to meet the ROD requirements;

- Identification of the property owners at the locations of the proposed wells and any anticipated issues with short- and long-term property access;
- A complete description, including diagrams, of proposed well construction details and specifications; drilling method and all drilling equipment; all pertinent construction materials; measurements of borehole, casing, and annular space; depths of screened and blank casing; proposed pumps, transducers, and any other dedicated or temporary downhole equipment; methods to be used to determine depths and elevations; wellhead and well vault construction detail and specifications; and any other related details. Construction diagrams shall be provided relative to the stratigraphy encountered;
- A complete description of proposed well development procedures;
- A complete description of treatment and/or disposal of development water, drilling muds, and any other potentially contaminated media;
- The groundwater sampling procedures and chemical and physical parameters to be included in the sample analyses of the new wells, pending incorporation into the overall monitoring plan;
- A Field Sampling Plan (FSP). This plan shall include the detailed sampling procedures for collecting samples during the pCBSA investigation that meet the data quality objectives (DQOs). The FSP shall include sampling objectives; sample locations and frequency; sampling equipment and procedures; sample handling and analysis; sample preservation, decontamination, and a breakdown of samples to be analyzed through the Contract Laboratory Program (CLP) and through other sources, as well as the justification for those decisions. The FSP shall be written so that a field sampling team unfamiliar with the site would be able to gather the samples and field information required. The FSP shall meet applicable EPA guidances. ***With EPA approval, this FSP may be combined in the same document with FSP information from other tasks in this SOW that require a FSP.***
- A Quality Assurance Project Plan (QAPP). The QAPP shall describe the project objectives and organization, functional activities, and data quality objectives, quality assurance/quality control (QA/QC) protocols that shall be used to achieve the desired data quality objectives DQOs. The QAPP shall meet applicable EPA guidances. ***With EPA approval, this QAPP may be combined in the same document with QAPP information from other tasks in this SOW that require a QAPP.***
- A site-specific health and safety plan shall be prepared with provisions for the data-acquisition work that specifies employee training, protective equipment, medical surveillance requirements, standard operating procedures, and a contingency plan in accordance with 40 CFR 300.150 of the NCP and 29 CFR 1910.120 1(1) and (1)(2).

With EPA approval, a single comprehensive Health and Safety Plan that is inclusive for all Remedial Design may be created and modified as necessary.

- A schedule of completion shall be submitted to EPA that shall present a list of the major tasks associated with this data acquisition, along with the start and end dates of each task.

All of the above plans and documents shall be subject to EPA approval. Respondent shall modify the documents in accordance with EPA comments, if any.

1.2.2 Field Work for pCBSA Data Acquisition

The Respondent shall implement the field work put forth in the approved Work Plan and FSP/QAPP according to the schedule put forth in the approved schedule of completion. Field work shall be conducted in accordance with the *Field Work Provisions* in the General Requirements section of this SOW. If the Respondent believes that the schedule will have to change, the Respondent shall contact EPA and request an approval of a change to the schedule of completion. EPA shall then determine whether to approve the requested change. The Respondent shall provide EPA with sufficient notice of, and information about, the field work for EPA to develop outreach materials to the public so that they are aware of the pCBSA Data Acquisition activities.

1.2.3 Completion Report for pCBSA Data Acquisition

The Respondent shall issue a Completion Report for pCBSA Data Acquisition [DIN Suffix 008] documenting the results of the work completed under this task. Respondent shall modify the draft Completion Report for pCBSA Data Acquisition according to EPA comments, if any. ***With EPA approval, Respondent may combine in a single document the contents of this completion report with those of other completion reports required under this SOW.*** The Completion Report shall include:

- Well Completion Documentation, including:
  - Exact well location with coordinates and map relative to surrounding area;
  - Well construction and materials detail
  - Diagrams of well depths, casing, annular spacing, packing, screened interval;
  - Initial water levels and water quality data
  - Property ownership and property access issues, including but not limited to permits and easements; and
  - Any other information necessary to document the completion of the wells;
- The objectives of the investigation;

- A description of the field activities documenting actual drilling, and sampling and analysis methods and procedures and how any of these may have differed from the pCBSA Data Acquisition Plan;
- A summary of the existing data on the distribution of the pCBSA plume;
- Results of any sampling or measurements collected as part of this RD task;
- Geologic logs from well installations;
- Graphics depicting:
  - locations of sampling points
  - hydrostratigraphic cross sections

1.3 Production Well Survey

The ROD (Section 13 Provisions 4.03 and 16.03), requires that well surveys be performed to monitor groundwater use within the areas where groundwater is affected or may become affected by contamination originating from the Joint Site. The minimum areas of the surveys are specified in the ROD. These well surveys shall identify all currently existing public, private, industrial, or irrigation water supply wells on file with the water master regardless of whether or not they are in operation at the time of the survey.

The Respondent has produced a draft Production Well Survey Report as part of an "advance groundwater work" program and has submitted this draft to EPA. This submittal is under review by EPA and it has not yet been determined whether it fulfills the requirements of this task.

By means of its existing work, and additional work as necessary or required by EPA, the Respondent shall produce a Production Well Survey Report [DIN Suffix 009], which shall include the following:

- Records from the local Watermaster, including records, applications, registrations, and permits pertaining to wells that have been or will be installed in the area of concern. Well construction details, 5-year well pumping histories and rates, 5-year water level histories, and 5-year water quality data shall be obtained wherever possible.
- All water purveyors in the area shall be surveyed and a determination will be made whether any new water production or injection wells have been or are being installed in the area, and whether there are any plans or intentions to install such wells in the next five years. Purveyors shall include but not necessarily be limited to The City of Torrance Municipal Water Department, the Southern California Water Company, the Dominguez Water Corporation, the Central- and West-Basin Municipal Water Districts, and the Central- and West-Basin Water Replenishment Districts. Well construction details, 5-

year well pumping histories and rates, 5-year water level histories, and 5-year water quality data shall be obtained wherever possible.

- An updated map of all well locations within the area of concern, with tabular references to well construction information, well status, well production rates, water level histories, water quality data shall be presented in the report.
- One or more scaled figures, annotated as necessary, allowing EPA to ascertain the relative distance between the distributions of pCBSA, benzene and chlorobenzene in groundwater and the water supply wells identified in the survey, shall be provided.

1.4 Compilation and Update of Other Sources of Groundwater Information

The Respondent shall research, acquire, compile, and update other sources of groundwater quality and water level information from monitoring wells at environmental investigations in the area potentially hydraulically affected by the remedial action anticipated in the design, or in close enough proximity to affect the designed remedial action if extraction or injection were to occur at the locations of the other sources of contamination. Information to be compiled shall include, where available, well construction details, and recent history of well pumping rates, water levels, and water quality data. The compilation shall include the most recent data available from each well in such investigations, regardless of whether the last sampling round included all the wells. The Respondent shall issue a Compilation of Outside Groundwater Data Report [DIN Suffix 010] to EPA containing all information gleaned from the compilation effort and shall modify it according to EPA comments, if any. The compilation report shall include, at a minimum, the status of the investigation discussed, the constituents of concern and analytes being tested for, the hydrostratigraphic units being investigated, the frequency of groundwater sampling for the other source, and information on groundwater gradient and flow direction as pertinent and appropriate. This task is intended to identify information that may bear on the remedial design work; it is not intended to require a detailed history of investigation and remediation at nearby facilities which may have no bearing on the design.

2 Remedial Design Activity Plan and Schedule

The Respondent shall prepare and submit to EPA a Remedial Design Activity Plan and Schedule. [DIN Suffix 015] In this submittal, the Respondent shall identify all the activities necessary to complete the tasks identified in the UAO and this SOW as well as those which the Respondent identifies as necessary to complete the work. The Respondent shall present the activities within the context of a schedule meeting the schedule requirements of the UAO and this SOW. The Respondent shall modify the Remedial Design Activity Plan and Schedule in accordance with EPA comments, if any. The Remedial Design Activity Plan and Schedule shall also be revised as

necessary during project execution as approved by EPA . Items to be included in the Remedial Design Activity Plan also shall include but not necessarily be limited to, as pertinent to this SOW:

- The objectives of the initial RD work ;
- The schedule for the RD (depicted using a GANTT chart) for the RD showing remedial design activities in this SOW;
- The schedule shall show all task logic, start date, end date, task duration, and float; the schedule shall also identify discrete milestones for the project.

The schedule will establish the enforceable deadlines for all deliverables and work under the UAO. EPA will confer with the Respondent on the schedule, and the Respondent will make changes to address EPA comments. Upon EPA approval of the schedule, it shall become the enforceable schedule under the UAO for the Respondent's work and submission of deliverables.

3 Preliminary Analysis of Pipeline Corridors and Easement, Access, and Permitting Requirements

The Respondent shall prepare and submit to EPA a Preliminary Analysis of Pipeline Corridors and Easement, Access, and Permitting Requirements [DIN Suffix 031]. It is recognized that pipeline corridors cannot be specified and evaluated in detail until the wellfield is established. In this analysis the Respondent shall identify in advance any issues with respect to easements, access requirements, and permitting requirements that may apply to construction of the portions of the remedial system that lie outside the boundaries of the former Montrose plant property. In the analysis, the Respondent shall identify and evaluate various land types (e.g. county street or right of way, city street or right of way, private residential property, industrial property, etc.) such factors as:

- Applicable agencies with jurisdiction in the matter;
- Potential issues with future uses of the property;
- Potential easements and legal encumbrances;
- Physical access restrictions in general and for major potential corridors;
- Access to needed facilities such as water, power, or sewer disposal during construction or remedial action;
- Potential for interference with community or business activities, and/or proximity to residential areas; and
- Permitting and other regulatory restrictions and matters.

PART II. GROUNDWATER MODELING AND WELLFIELD OPTIMIZATION

A computer-based groundwater flow and contaminant transport model ("the model" and "modeling") shall be developed and used during the remedial design for the purposes of (1) assisting in evaluating the potential for adverse migration of NAPL and dissolved phase contaminants, (2) assisting in verifying the compliance with ROD performance requirements, (3) assisting in optimizing the remedial design to maximize the effectiveness of the remedial action, and (4) any other purposes determined necessary during the remedial design effort. The computer model developed during the feasibility study shall be utilized as appropriate, given its limitations and uncertainties, to complete the remedial design. It is recognized that some aspects of design may not be amenable to modeling and may require field data or field tests to establish.

The model will serve as a tool in optimizing the wellfield, including the locations of extraction and injection wells and the distribution of pumping and injection rates among these wells. It is recognized that a model was developed and used for the Joint Groundwater Feasibility Study. This model was suitable for FS purposes, but was not optimized with respect to remedial design. Additional information, including field data such as aquifer tests, will be necessary to achieve this purpose.

4 Model Development

EPA plans to confer with the Respondent on the modeling code and pre- and post-processing routines to be used for the remedial design modeling effort. EPA intends to use a publicly available model for the Dual Site Groundwater Remedial Design.

A site-specific input set for the model shall be developed. During development, the input parameters will be evaluated and the method for determining their values will be established. Any options for how the model will be run will be established. Additional data will be collected from the field to determine reduce uncertainty in the modeling where appropriate. The model will be calibrated and sensitivity analyses will be run and documented prior to running the model to generate modeling results on modeling scenarios.

At a minimum, the model shall be used to facilitate and support: (1) the development of the spatial configuration of the remedial wellfield, (2) the optimization of the wellfield (well locations and pumping/injection rates) per Section 13 Article 11 of the ROD, (3) evaluation of the effectiveness of the RD with respect to removal of the chlorobenzene plume (as specified in the ROD, Section 13 Article 9.03), and (4) evaluation of the effectiveness of the RD with respect

to limiting adverse migration of contaminants within the context of the remedial alternatives (ROD, Section 13 Article 10).

4.1 Kickoff Meeting for Groundwater Model Development

The Respondent shall attend a technical meeting with EPA to discuss strategies for modeling development and identifying and planning for modeling data needs. This meeting will occur prior to initiation of the Work Plan for Model Development.

4.2 Work Plan for Groundwater Model Development

This is an EPA Work Item. EPA plans to perform the following activities in support of this task. Respondent shall be responsible for work items identified following the EPA planned activities.

EPA plans to develop a Work Plan for Groundwater Model Development [DIN Suffix 016]. This plan will outline the modeling development tasks and strategies for accomplishing them. EPA plans to include the following elements in this plan:

- A clear definition of the intended purposes and objectives of the model in the context of this remedial design;
- Identification of the proposed modeling program, code version, ancillary routines, pre- and post-processing routines, and the rationale for using these;
- A discussion of the proposed connection between the RD model and the previous model used for the Joint Groundwater Feasibility Study;
- The modeling methodology; specifically, a systematic presentation of the proposed refinements to the JGWFS model or the detailed development of a new model;
- The rationale for model development along with the approach to be taken to identify appropriate grid alignment and spacing, input parameters and initial and boundary conditions, method for defining the modeling domain;
- A plan for refining the grid spacing, if necessary;
- The model calibration approach; specifically, a discussion of how additional calibration runs shall be made using the results of the pilot testing as a basis of calibration refinement;
- A comprehensive discussion of the approach to flow and transport model calibration;
- The approach to developing an optimized configuration for the remedial wellfield (with respect to both pumping and injection well location and refined pumping/injection rates in the context of the remedial alternative specified in the ROD);
- Discussion of anticipated model uncertainties and limitations;

- An evaluation and specification of modeling assumptions to be used;
- A review of existing data and data gaps in terms of model input parameters;
- A plan for performing sensitivity analyses on the developing model, including which analyses will be performed and why;
- The methods for determining where additional field data is required; and
- A discussion of how expected modeling uncertainties will be reduced through additional data collection.

The Respondent shall be available to meet and consult with EPA on issues related to the Modeling Plan. EPA may also assign to the Respondent in writing additional planning activities that are pertinent to the completion of the Modeling Work Plan. This may include producing various graphics or data from field efforts the Respondent has performed. Respondent shall perform the additional modeling development activities identified by EPA as necessary for the appropriate development of the model.

4.3 Development of Parameters, Modeling Grid and Calibration

This is an EPA Work Item. EPA plans to perform the following activities in support of this task. Respondent shall be responsible for work items identified following the EPA planned activities.

EPA plans to develop the modeling parameters and values for those parameters, refine the modeling grid, and calibrate the model in accordance with the Work Plan for Modeling Development. EPA intends to perform calibration for the groundwater flow component of the model and the contaminant transport component of the model. As necessary, EPA plans to provide interim documentation on these activities.

The Respondent shall be available to meet and consult with EPA on issues related to parameters, modeling grid, and calibration. EPA may also assign to the Respondent in writing additional modeling development activities that are pertinent to the completion of the modeling effort. This may include, as an example, analysis of certain input variables. Respondent shall perform the additional modeling development activities identified by EPA as necessary for the appropriate development of the model. This may include producing various graphics or data from field efforts the Respondent has performed. Respondent shall submit analyses requested to EPA for review and approval. The modeling parameters, grid, and calibration will be subject to EPA verification, certification and approval.

4.4 Sensitivity Analysis and Sensitivity Analysis Report

This is an EPA Work Item. EPA plans to perform the following activities in support of this task. Respondent shall be responsible for work items identified following the EPA planned activities.

EPA plans to perform a sensitivity analysis and issue a Sensitivity Analysis Report [DIN Suffix 017]. EPA plans to include within the sensitivity analysis report the results of the analysis of:

- Sensitivity of the model results to changes in the values of parameters that affect the simulated hydraulic-head solutions.
- Sensitivity of the model results to changes in the values of parameters that affect the simulated solute-transport solutions.
- Sensitivity of the model results to changes in the values of parameters that affect the achievement of ROD standards.

EPA may modify the Sensitivity Analysis Report to incorporate new analyses, as needed for development of the model.

The Respondent shall be available to meet and consult with EPA on issues related to sensitivity analysis. EPA may also assign to the Respondent in writing additional sensitivity analysis activities that are pertinent to the completion of the modeling effort. Respondent shall perform such activities and submit analyses requested to EPA for review and approval. This may include producing various graphics or data from field efforts the Respondent has performed, or generating certain focused sensitivity analyses.

4.5 Aquifer Testing

The Respondent shall plan, perform, and report on aquifer testing from either previously existing groundwater monitoring wells, and/or from wells to be installed in response to this SOW. Sufficient aquifer testing shall be performed to attain the objectives of the remedial design by refining the groundwater model and reducing the uncertainty in the modeling results. Aquifer testing will provide data to estimate horizontal hydraulic conductivity and storativity within the modeling domain, if observation wells are in the immediate vicinity and adequate response to pumping is observed. Vertical conductivity may also be evaluated from this data if it is determined by EPA that it is necessary and it is possible to do so. These data, estimates and evaluations, to the extent they can be determined by EPA to be reliable, can then be used in lieu of less-certain estimates or rough calculations of these values. The sensitivity analyses

performed under the previous task shall be considered in evaluating which aquifer tests shall be necessary. EPA shall determine the degree of the need for aquifer testing under this task.

4.5.1 Aquifer Testing Plan

The Respondent shall develop and issue to EPA an Aquifer Testing Plan. [DIN Suffix 018] This Aquifer Testing Plan will be focused on areas within the chlorobenzene plume as defined in the ROD, the pCBSA plume, and areas outside these plumes but related hydraulically to the remedy to be implemented in the ROD, as necessary. It will not be focused on testing for areas in the benzene plume as defined in the ROD. The Plan shall contain provisions for all aquifer testing to be performed during the remedial design work. As new aquifer testing needs are identified, the Respondent shall amend the Aquifer Testing Plan as necessary to complete the work. The Respondent may amend the Aquifer Testing Plan of its own accord, with EPA approval. Alternately, EPA may issue a request to the Respondent to amend the Aquifer Testing Plan when EPA determines such modifications are necessary to adequately meet the objectives of the remedial design. At a minimum, the Aquifer Testing Plan shall include:

- Identification of the specific wells at which aquifer tests will be performed;
- The objectives of the aquifer testing at any given well (what parameters are to be refined, what purpose, such as refining the modeling grid, will the test serve);
- Explanation of the type of aquifer tests to be employed at each well identified;
- The methodology to be used for the aquifer testing including the approach to be used to determine the pumping rate(s) and duration of the tests;
- The field equipment and procedures to be employed, including equipment and procedures for measuring water levels and draw downs, recording the data during the test, monitoring the test, and quality control procedures;
- The plan for safe and compliant disposal of extracted groundwater during the test;
- The methodology to be used to interpret the aquifer test data once it is received from the field;
- Identification of any permits or other authorizations by other agencies which may be required in order to conduct the work, and the list of contact names and documents at those agencies which will apply; and
- A schedule for the aquifer test work.

The Respondent shall modify the Aquifer Test Plan in accordance with EPA comments, if any. The Respondent shall also modify any amended Aquifer Test Plan in accordance with EPA Comments, if any, as work proceeds.

4.5.2 Aquifer Testing Field Work

The Respondent shall implement the field work put forth in the approved Work Plan and FSP/QAPP according to the schedule put forth in the approved schedule of completion. Field work shall be conducted in accordance with the *Field Work Provisions* in the General Requirements section of this SOW. If the Respondent believes that the schedule will have to change, the Respondent shall contact EPA and request an approval of a change to the schedule of completion. EPA shall then determine whether to approve the requested change. The Respondent shall provide EPA with sufficient notice of, and information about, the field work for EPA to develop outreach materials to the public so that they are aware of the Aquifer Testing activities.

4.5.3 Aquifer Testing Results Report

The Respondent shall issue an Aquifer Testing Results Report [DIN Suffix 019], and shall modify the Aquifer Testing Results Report according to EPA comments, if any. The Aquifer Testing Results Report shall document the field efforts for the aquifer tests, provide the results of the aquifer tests, and show the estimates of the applicable aquifer parameters being measured or calculated as a result of the test, as well as the calculations leading to the calculated result. The Report shall include, but not be limited to:

- Identifying any deviations from the Aquifer Test Plan due to field conditions or decisions;
- Providing field notes and complete discussion confirming how the tests were performed;
- Providing and documenting the duration of the tests;
- Showing the calculations and step-by-step intermediate and final results from the methodology to reduce the aquifer test data to generate estimates of aquifer parameters;
- Providing an appendix showing the raw drawdown and/or recovery data;
- Providing a summary of conclusions and measured values;
- Documenting all field activities and providing any other data derived from the tests; and
- Providing a description and certification of the capture, storage, and/or disposal of extracted groundwater during the test.

The Respondent shall amend the Aquifer Testing Results Report if additional aquifer testing work is identified, planned and executed later in the project.

4.6 Additional Monitoring Wells for Model Refinement

The Respondent shall install and sample additional monitoring wells as determined necessary by EPA to refine the model. The Respondent shall run aquifer tests on these wells, as determined necessary by EPA, pursuant to the provisions of Aquifer Testing in this SOW. These wells shall provide additional water quality results, water level measurements, and aquifer test results as necessary to refine the model and provide for ultimate remedial design. Results from sampling these new wells or conducting aquifer tests shall be reported in the Monitoring and Compliance Reports required in the Monitoring Program (see below) and the Aquifer Testing Results Report, respectively.

4.6.1 Work Plan: Additional Monitoring Wells for Model Refinement

If the installation and sampling of additional monitoring wells are determined necessary by EPA in order to refine the model, the Respondent shall develop a Work Plan for Additional Monitoring Wells for Model Refinement,[DIN Suffix 020] and refine this document in accordance with EPA comments, if any. The work plan will include:

- A description of the modeling refinement objectives to be accomplished by additional wells;
- The identification and rationale for the number and locations of monitoring wells to be installed to meet the objectives;
- Identification of the property owners at the locations of the proposed wells and any anticipated issues with short- and long-term property access;
- A complete description, including diagrams, of proposed well construction details and specifications; drilling method and all drilling equipment; all pertinent construction materials; measurements of borehole, casing, and annular space; depths of screened and blank casing; proposed pumps, transducers, and any other dedicated or temporary downhole equipment; methods to be used to determine depths and elevations; wellhead and well vault construction detail and specifications; and any other related details. Construction diagrams shall be provided relative to the stratigraphy encountered;
- A complete description of proposed well development procedures;
- A complete description of treatment and/or disposal of development water, drilling muds, and any other potentially contaminated media;
- The groundwater sampling procedures and chemical and physical parameters to be included in the sample analyses of the new wells, pending incorporation into the overall monitoring plan;

- A Field Sampling Plan (FSP). This plan shall include the detailed sampling procedures for collecting samples during the TCE investigation that meet the data quality objectives (DQOs). The FSP shall include sampling objectives; sample locations and frequency; sampling equipment and procedures; sample handling and analysis; sample preservation, decontamination, and a breakdown of samples to be analyzed through the Contract Laboratory Program (CLP) and through other sources, as well as the justification for those decisions. The FSP shall be written so that a field sampling team unfamiliar with the site would be able to gather the samples and field information required. The FSP shall meet applicable EPA guidances. ***With EPA approval, this FSP may be combined in the same document with FSP information from other tasks in this SOW that require a FSP.***
- A Quality Assurance Project Plan (QAPP). The QAPP shall describe the project objectives and organization, functional activities, and data quality objectives, quality assurance/quality control (QA/QC) protocols that shall be used to achieve the desired data quality objectives DQOs. The QAPP shall meet applicable EPA guidances. ***With EPA approval, this QAPP may be combined in the same document with QAPP information from other tasks in this SOW that require a QAPP.***
- A schedule of completion shall be submitted to EPA that shall present a list of the major tasks associated with this well installation, along with the start and end dates of each task.

It is anticipated that additional wells, if any, will be necessary in the water-bearing hydrostratigraphic units other than the Lower Bellflower Aquitard and the Gage-Lynwood Aquitard. EPA may determine, however, that additional monitoring wells for focused purposes in these low-permeability units is necessary to the design. EPA intends to confer with the Respondent prior to making any such determination. However, Respondent shall perform additional well installations to address such focused purposes if determined necessary by EPA.

4.6.2 Field Work for Additional Monitoring Wells for Model Refinement

The Respondent shall implement the field work put forth in the approved Work Plan and FSP/QAPP according to the schedule put forth in the approved schedule of completion. Field work shall be conducted in accordance with the *Field Work Provisions* in the General Requirements section of this SOW. If the Respondent believes that the schedule will have to change, the Respondent shall contact EPA and request an approval of a change to the schedule of completion. EPA shall then determine whether to approve the requested change. The Respondent shall provide EPA with sufficient notice of, and information about, the field work for EPA to develop outreach materials to the public so that they are aware of the monitoring well installation and sampling activities.

4.6.3 Model Refinement Monitoring Wells Completion Report

The Respondent shall provide a Completion Report for Model Refinement Monitoring Wells, [DIN Suffix 021] documenting the field work to install the monitoring wells installed with the objective of refining the modeling development.

4.7 Model Documentation Report

This is an EPA Work Item. EPA plans to perform the following activities in support of this task. Respondent shall be responsible for work items identified following the EPA planned activities.

EPA plans to produce a Model Documentation Report [DIN Suffix 022] and modify the Model Documentation Report as it determines necessary. The purpose of the Model Documentation Report shall be to document the entire exercise of developing the model for site-specific use, developing values for input parameters, defining the grid and initial conditions, and calibrating the model. EPA plans to share the draft model documentation report with the Respondent. Respondent shall be available to EPA for consultation and input of its concerns.

The Respondent shall be available to meet and consult with EPA on issues related to the Model Documentation Report. EPA may also assign to the Respondent in writing additional modeling development activities that are pertinent to the completion of the Modeling Documentation Report. Respondent shall perform the additional activities identified by EPA as necessary for the appropriate completion of the report. This may include producing various graphics or data from field efforts the Respondent has performed, or performing analysis of data. Respondent shall submit analyses requested to EPA for review and approval.

4.7.1 Revisions to the Conceptual Model

EPA plans to revise the conceptual model of the Joint Site, as appropriate, using the results of data-acquisition and pilot-testing tasks and presented in the conceptual model section of the RD Groundwater Model Report.

EPA plans to include the following in the conceptual model section of the report, relying on information provided by Respondents in other deliverables required in this SOW:

- Objectives of the RD modeling.
- Brief description of the JGWFS model.
- Description of hydrogeologic conditions in the area of the TCE plume based on the results of the data-acquisition tasks related to the TCE plume.
- Maps of top and bottom elevations of the aquifers and aquitards, if different from those in the JGWFS model or for the area of TCE plume.
- Maps of water-level elevation for all aquifer units.
- Maps of sources and spatial distribution of TCE in all aquifer units based on the results of the TCE data-acquisition task, and any other wells sampled in response to this SOW;
- Maps of the spatial distribution of the benzene plume in all aquifer units (if different from that described in the JGWFS) based on the results of the benzene investigation in the vicinity of the WRC Building, and any other wells sampled in response to this SOW;
- Maps of sources and spatial distribution of chlorobenzene in all aquifer units based on the results of the monitoring task, and any other wells sampled in response to this SOW;
- Maps of the spatial distribution of p-CBSA in all aquifer units based on the results of the p-CBSA data acquisition task, and any other wells sampled in response to this SOW;
- Summary of the results of the pilot and aquifer testing including well flow rates, water levels, hydraulic parameters of the tested aquifers.

The Respondent shall be available to meet and consult with EPA on issues related to the conceptual model. EPA may also assign to the Respondent in writing additional activities related to updating the conceptual model. Respondent shall perform such activities and submit analyses requested to EPA for review and approval. This may include producing various graphics or data from field efforts the Respondent has performed, or performing analysis of data.

4.7.2 Numerical Model Development

EPA plans to detail the following items pertaining to numerical model development in the Model Documentation Report:

- The rationale behind the continued use of the JGWFS model or the selection of a new numerical code as the basis for the model;
- Complete modeling description, identification of all routines and procedures used for modeling;
- The delineation of the modeling domain;
- The development of the numerical grid including discretization (i.e., grid spacing or element size);
- The development of model input files including hydraulic properties, transport properties, and initial and boundary conditions and the rationale for their use;
- Graphics showing model grid for each layer, boundary conditions at each boundary, and site data used to develop those boundary conditions. Include transport and hydraulic boundary conditions.

The Respondent shall be available to meet and consult with EPA on issues related to numerical model development. EPA may also assign to the Respondent in writing additional activities that are pertinent numerical model development so that the Model Documentation Report can be completed. Respondent shall perform such activities and submit analyses requested to EPA for review and approval. This may include producing various graphics or data from field efforts the Respondent has performed, or performing analysis of existing data.

4.7.3 Model Calibration

EPA plans to account for the results of the data acquisition and pilot testing tasks of the RD in the model calibration and include these within the Model Documentation Report. EPA plans to include within this section of the Model Documentation Report:

- Development of calibration standards for flow calibration;
- Flow calibration (including calibration to the results of the pilot testing);
- Development of calibration standards for solute transport calibration; and
- Solute transport calibration (including calibration to the results of the pilot testing)

The Respondent shall be available to meet and consult with EPA on issues related to model calibration. EPA may also assign to the Respondent in writing additional activities related to model calibration that are pertinent to the completion of the Modeling Documentation Report.

The Respondent shall perform such activities and submit analyses requested to EPA for review and approval. This may include producing various graphics or data from field efforts the Respondent has performed, or evaluation of such data.

5 Optimization of Wellfield and Well Rate Distribution

Optimization is a process by which the remedial design is adjusted to attain maximum effectiveness with respect to meeting the requirements of the ROD.

The remedial design shall be optimized, at a minimum, for the following:

- For the efficiency and rate of removal of contaminants;
- For pore volume flushing;
- For the rate of reduction of the volume of groundwater with concentrations of contaminants in excess of ISGSs;
- For early time performance (See Sections 11 and 12 of the ROD);
- For meeting all performance provisions above with respect to reduction of the plume outside the containment zone;
- For the certainty of containment of contaminants in the containment zone and the overall chlorobenzene plume; and
- To limit the potential for adverse migration of contaminants and NAPL during the course of the remedial action;

while meeting all provisions and objectives of the ROD.

The spatial configuration of injection and extraction wells, and the distribution of pumping and injection rates to be used in the wellfield among the various hydrostratigraphic units, shall be determined and optimized in the remedial design phase. Optimization shall be performed by the Respondent as determined necessary by EPA, in the remedial design.

Modeling runs, aquifer test results, data from all monitoring wells, field optimization data, and factors such as water quality and geochemistry at individual wells, shall be used to optimize the location of injection and monitoring wells (the wellfield) and the rates at which the wells should be pumped/should reinject. (pump rate distribution). Once the wellfield and well pump rates are established, the formal remedial design (design of the hardware in the system itself) can progress.

5.1 Development of Modeling Scenarios

This is an EPA Work Item. EPA plans to perform the following activities in support of this task. Respondent shall be responsible for work items identified following the EPA planned activities.

Before running the refined RD model, EPA plans to develop a list of modeling scenarios [DIN Suffix 023] to be modeled in order to meet the objective of optimizing the remedial wellfield and well rate distribution. EPA plans to include within the list the following:

- A clear, concise definition of each scenario, along with a label and number for the scenario;
- A description of the physical characteristics of each scenario;
- The inputs to each scenario, including initial conditions, domain, and grid; especially if these are to differ from those of other runs;
- The expected outputs from each scenario;
- Any ancillary or postprocessing routines to be used on each scenario;
- The purpose for running the scenario; and
- A discussion of the relationship between any of the scenarios and intended questions to be answered by the modeling run.

The Respondent shall be available to meet and consult with EPA on issues related to development of modeling scenarios. EPA may also assign to the Respondent in writing additional activities related to development or modeling scenarios that are pertinent to the completion of the task. The Respondent shall perform such activities and submit analyses requested to EPA for review and approval.

5.2 Modeling Runs

This is an EPA Work Item. EPA plans to perform the following activities in support of this task. Respondent shall be responsible for work items identified following the EPA planned activities.

EPA plans to use the calibrated remedial design model to simulate each of the approved remedial wellfields scenarios. EPA plans to run the model and obtain the results in accordance with each approved scenario and the developed model, with the objective of optimizing the remedial design with respect to the wellfield and well rate distribution. During the modeling runs, the Respondent shall meet regularly with EPA.

The Respondent shall be available to meet and consult with EPA on issues related to modeling runs. EPA may also assign to the Respondent in writing additional pertinent activities related to

modeling runs. The Respondent shall perform such activities and submit analyses requested to EPA for review and approval.

5.3 Field Optimization

This task shall be performed by the Respondent. In addition to the computer-based groundwater flow and contaminant transport model and the pilot testing required by this SOW, hydraulic response tests using actual hydraulic extraction and injection systems, shall be employed as determined necessary by EPA, in conjunction with modeling simulations to optimize and adjust the remedial design prior to its finalization. Respondent shall perform such additional work and reporting as requested by EPA to provide field-based optimization of the wellfield and well rate distribution. Where such work is performed, Respondent shall modify the documents requested by EPA in accordance with EPA comments, if any.

5.4 Optimization of Wellfield and Well Rate Distribution Report

This is an EPA Work Item. EPA plans to perform the following activities in support of this task. Respondent shall be responsible for work items identified following the EPA planned activities.

EPA plans to prepare an Optimization of Wellfield and Well Rate Distribution Report (OWWRDR). [DIN Suffix 024] The OWWRDR will present the results of all simulations to optimize the spatial configuration and pumping/injection rates of the remedial wellfield for the chlorobenzene, benzene, TCE and pCBSA plumes. The OWWRDR will present the results of simulations by the calibrated RD model to attain maximum effectiveness of the wellfield with respect to meeting the requirements and design criteria of the ROD.

The results of these simulations will be evaluated with respect to the following criteria specified in the ROD:

- For the efficiency and rate of removal of contaminants:
- For pore volume flushing;
- For the rate of reduction of the volume of groundwater with concentrations of contaminants in excess of ISGSs;
- For early time performance (See Sections 11 and 12 of the ROD);
- For meeting all performance provisions above with respect to reduction of the plume outside the containment zone;
- For the certainty of containment of contaminants in the containment zone;
- To limit the potential for adverse migration of dissolved contaminants and NAPL during the course of the remedial action.

The locations and flow rates of wells shall then be optimized as necessary to maximize the compliance with the requirements of the ROD.

The Respondent shall be available to meet and consult with EPA on issues related to the OWWRDR.

PART III. GROUNDWATER MONITORING PROGRAM

The ROD requires groundwater monitoring during remedial design for a variety of reasons. These include but are not limited to monitoring compliance and transgressions of the containment zone, maintaining ongoing measurements of aquifer flow direction and water quality, and the movement of pCBSA with respect to production wells. In addition, monitoring will be necessary in order to optimize the design. The intention is to keep and control the all monitoring well sampling and analysis in one place so that the minimum number of mobilizations of field crews can meet all of the varying objectives for groundwater monitoring that emerge during the remedial design process. Also, any relationships among these objectives can be quickly seen and coordinated.

The monitoring program is designed to be an ongoing process. That is, additional monitoring needs will arise on an ongoing basis during the remedial design, and each time the monitoring program will be modified to address those needs.

The monitoring program includes sampling and analysis of water from groundwater monitoring wells, as well as taking water level measurements. It does not, however, include aquifer testing, which is included in the Aquifer Testing Work Plan.

Monitoring shall be primarily concerned with the water-bearing hydrostratigraphic units other than the Lower Bellflower Aquitard and the Gage-Lynwood Aquitard. EPA may determine that focused sampling in these low-permeability units is necessary to the design. EPA intends to confer with the Respondent prior to making any such determination. However, Respondent shall perform additional monitoring to address such focused investigations if determined necessary by EPA.

6 Monitoring and Aquifer Compliance Plan

The Monitoring and Aquifer Compliance Plan (MACP) shall be primarily an EPA work item. However, certain components of the MACP will be developed by the Respondent and submitted to EPA for inclusion in the MACP. For simplicity, these work items are separated in different subsections of this task.

6.1 Development of Monitoring and Aquifer Compliance Plan

This is an EPA Work Item. EPA plans to develop and produce the Monitoring and Compliance Plan, after conferring with the Respondent and receiving certain deliverables from the Respondent, which are identified in the subsequent subtasks of this task. Respondent shall also be responsible for work items on this subtask that are identified following the EPA planned activities.

The Monitoring and Aquifer Compliance Plan (MACP)[DIN Suffix 041] shall be the authoritative planning document for the groundwater monitoring activities. In the MACP, all objectives for groundwater monitoring from various elements of design activities will be identified, along with the approach to meeting those objectives. The MACP will be amended over time as new objectives and monitoring needs are identified. The MACP will shall meet the following objectives as well as any other objectives identified by EPA as necessary to adequately complete the remedial design process. Article 13-Provision 8.03 of the ROD contains requirements for the MACP.

The MACP shall provide for sampling of monitoring wells sufficient to meet the objectives in the ROD. Additional monitoring wells shall be installed, as necessary, to achieve the objectives of the monitoring plan (See next section of this SOW). Continual monitoring shall be conducted as part of this remedy in accordance with the EPA-approved MACP for as long as the containment zone and plume reduction action are in effect as part of the remedy. The frequency of monitoring at any given well in the network at any given time shall be established in the MACP and may be changed over time with EPA approval.

Objectives of the MACP with respect to the Containment Zone.

EPA plans to include MACP monitoring network and provisions provide for:

- Confirmation that contaminants within the containment zone have not left the zone;
- Data sufficient to reliably evaluate compliance with any and all requirements, standards, and provisions in the ROD;
- Reliable evaluation of the lateral and vertical movements of all contaminants of concern within the containment zone;

- Reliable evaluation of the lateral and vertical movements of benzene, TCE, and chlorobenzene in response to hydraulic extraction in the overall system;
- Evaluation of the effectiveness of partial containment of the TCE plume by hydraulic extraction and the degree of movement of TCE toward the boundary of the containment zone;
- Data sufficient to determine groundwater levels, hydraulic gradients, reliable groundwater elevation contour maps, effects of any local pumping both on and off the Joint Site, and groundwater flow velocities within all of the affected hydrostratigraphic units at the Joint Site being pumped or monitored;
- Verification and evaluation of the zones of capture of extraction wells and the radii of influence of extraction and injection wells;
- Reliable evaluation of gradient control measures;
- Data sufficient to measure and verify drawdowns in the immediate vicinity of the NAPL sources due to pumping;
- Evaluation of efforts to optimize the wellfields and pump rates associated with hydraulic extraction and aquifer injection of treated water so as to provide the greatest certainty of long-term containment, and reduce the potential for plume interactions and adverse migration of NAPL and dissolved contaminants; and
- Reliable concentrations of contaminants in treatment system influent and effluent, and treatment streams so as to assess the effectiveness and performance of the treatment system.

Objectives of the MACP with Respect to Reduction of the Chlorobenzene Plume

EPA plans to include within the MACP a well network and provisions for:

- Data sufficient to reliably evaluate compliance with any and all requirements, standards, and provisions in the ROD;
- Reliable estimates of the rate that the volume of contaminated groundwater with concentrations of contaminants above ISGS levels is being reduced;
- Reliable estimates of the rate that mass of contaminants is being removed from the groundwater;
- Reliable estimates of the pore volume flushing rates throughout the remaining plume that is contaminated with concentrations of contaminants in excess of ISGS levels;
- Reliable evaluation of the lateral and vertical movements of all contaminants of concern within the plume reduction zone;

- Reliable evaluation of the lateral and vertical movements of benzene, TCE, and chlorobenzene in response to hydraulic extraction in all hydrostratigraphic units being pumped or monitored;
- Data sufficient to determine groundwater levels, hydraulic gradients, reliable groundwater elevation contour maps, effects of any local pumping both on and off the Joint Site, drawdowns, and groundwater flow velocities within all of the affected hydrostratigraphic units being pumped or monitored at the Joint Site;
- Verification and evaluation of the zones of capture of extraction wells and the radii of influence of extraction and injection wells;
- Reliable evaluation of the effectiveness of vertical and horizontal gradient control measures;
- Data sufficient to measure and verify drawdowns in the immediate vicinity of the NAPL sources due to pumping;
- Evaluation of efforts to optimize the wellfields and pump rates associated with hydraulic extraction and aquifer injection so as to provide the greatest certainty of long-term containment, and reduce the potential for plume interactions and adverse migration of NAPL and dissolved contaminants; and
- Reliable concentrations of contaminants in treatment system influent and effluent, and treatment streams so as to assess the effectiveness and performance of the treatment system.

Monitoring Well Network

EPA plans to maintain within the MACP a master spreadsheet of all monitoring wells being sampled or having water levels measured. The total of all wells being sampled at any frequency for any purpose shall be referred to as the **active** monitoring well network. The active monitoring well network shall be shown on a map in the MACP for each hydrostratigraphic unit. Pertinent well construction information shall be available in the MACP. The MACP shall also show a map ~~for~~ each hydrostratigraphic unit ~~that~~ shows all monitoring wells available to the project, including those not presently being sampled. This shall be referred to as the potential monitoring well network. The spreadsheet of the active monitoring well network shall identify for each well the frequency of sampling, the analytes being sampled, the screened interval, the hydrogeologic unit being monitored by the well, a description of the objectives being addressed by the sampling of the well, including whether the well is a sentinel well (i.e. serves to signify whether there is a transgression of the containment zone).

The approved MACP will establish the monitoring objectives, which shall include but not be limited to the objectives specified in the ROD, and shall list the monitoring wells serving each objective. During the remedial design phase of the remedy, the wells necessary to meet each

objective shall be identified, taking into account the location, construction, and other circumstances associated with all existing wells. Should EPA determine that additional wells are necessary to meet the objectives in the approved Monitoring Plan, such wells shall be installed and sampled by the Respondent (See the Section 24 of this SOW).

Monitoring Wells With Regard to Containment

EPA plans to include in the MACP provision for sufficient monitoring wells around the periphery of the containment zone in each hydrostratigraphic unit where the containment zone occurs to ensure that failures of the remedial actions to contain contaminants to the containment zone (transgressions of containment) will be promptly detected. Sufficient numbers of monitoring wells also shall be placed in the hydrostratigraphic units below the containment zone to determine that contaminants have not migrated vertically out of the containment zone. Monitoring well construction and locations shall be approved by EPA as part of the remedial design and additional wells may be added as determined necessary by EPA during the remedial action and operation and maintenance (O&M) phase. This may include wells in either aquifers or aquitards.

Monitoring Frequency

EPA plans to identify within the MACP the frequency of monitoring for all wells in the monitoring network, in accordance with the ability to attain the stated monitoring objectives. Any changes to the monitoring frequency for one or more wells shall be approved by EPA by means of an amendment to the Monitoring Plan which states the justification for the changes.

Compliance Monitoring Provisions

EPA plans to include within the MACP a strategy and discussion for how compliance with the containment zone shall be verified and monitored. In other words, containment of dissolved phase contamination near the NAPL to the zone of containment identified in the ROD shall be periodically monitored in accordance with the MACP. This strategy shall identify the wells that will be used for this objective, identify any new wells needed, outline the procedure by which a transgression of containment will be identified from the monitoring data, including water level data, pump rate and aquifer response data, or any other data available to assess compliance, and discuss any uncertainties in the data and ways of reducing uncertainties that containment is being maintained.

Respondent Responsibilities

The Respondent shall be available to meet and consult with EPA on issues related to development and modification of the MACP. EPA may also assign to the Respondent in writing additional pertinent activities related to MACP development or modification. The Respondent shall perform such activities and submit analyses requested to EPA for review and approval.

This may include producing various graphics or data from field efforts the Respondent has performed, or evaluation of such data.

6.2 Field Sample Plan and Quality Assurance Plan

This portion of the MACP shall be completed by the Respondent. EPA plans to incorporate this portion into the MACP upon approving the completion of this work. The Respondent shall not reference previously- approved documents used during the remedial investigation / feasibility study process but shall create new documents for the remedial design. The MACP shall include the groundwater sampling procedures and chemical and physical parameters to be included in the sample analyses of all wells in the active network. In addition, the MACP shall contain the following:

- A Field Sampling Plan (FSP). This plan shall include the detailed sampling procedures for collecting samples during the well installation and sampling that meet the data quality objectives (DQOs). The FSP shall include sampling objectives; sample locations and frequency; sampling equipment and procedures; sample handling and analysis; sample preservation, decontamination, and a breakdown of samples to be analyzed through the Contract Laboratory Program (CLP) and through other sources, as well as the justification for those decisions. The FSP shall be written so that a field sampling team unfamiliar with the site would be able to gather the samples and field information required. The FSP shall meet applicable EPA guidances. *With EPA approval, this FSP may be combined in the same document with FSP information from other tasks in this SOW that require a FSP.*
- A Quality Assurance Project Plan (QAPP). The QAPP shall describe the project objectives and organization, functional activities, and data quality objectives, quality assurance/quality control (QA/QC) protocols that shall be used to achieve the desired data quality objectives DQOs. The QAPP shall meet applicable EPA guidances. *With EPA approval, this QAPP may be combined in the same document with QAPP information from other tasks in this SOW that require a QAPP.*
- A site-specific health and safety plan shall be prepared with provisions for the data-acquisition work that specifies employee training, protective equipment, medical surveillance requirements, standard operating procedures, and a contingency plan in accordance with 40 CFR 300.150 of the NCP and 29 CFR 1910.120 1(1) and (1)(2). *With EPA approval, a single comprehensive Health and Safety Plan that is inclusive for all Remedial Design may be created, and modified as necessary.*

6.3 Well Maintenance and Well Abandonment

This portion of the MACP shall be completed by the Respondent. EPA plans to incorporate this portion into the MACP upon approving the completion of this work performed by Respondent. The Respondent shall plan for well maintenance for wells which require repair; and proper well abandonment for wells which EPA determines are no longer needed, are no longer usable or serviceable, or must be destroyed for such reasons as redevelopment by the property owner on the property on which the well is located. The MACP shall provide for well maintenance and abandonment to the extent necessary to maintain the effectiveness and completeness of the monitoring well network established in the Monitoring and Compliance Plan (MACP). This section of the MACP shall address standard well maintenance, maintenance frequencies, and standard well abandonment procedures. The detailed well abandonment procedures shall be in accordance with any applicable State of California well abandonment procedures, including but not limited to method of casing destruction, materials (e.g. grout) to be used, introduction method, set times, etc.

The Respondent shall modify this portion of the MACP according to EPA comments, if any.

7 Baseline Groundwater Sampling and Water Levels

Respondent shall perform a baseline round of sampling of the combined Montrose - Del Amo monitoring well network. This sampling will serve to provide updated input of current groundwater quality and water levels to the remedial design modeling program, and to update the knowledge of the current position and concentrations within the plume as remedial design is initiated. This will serve as a baseline for future compliance and operational monitoring to be performed in accordance with the MACP.

It is recognized that the Shell Oil Company is a Respondent to EPA under a separate enforcement instrument for the Dual Site Groundwater Remedial Design, and that some of the wells in the monitoring well network will be sampled by Shell for this task. EPA intends to afford Shell and the Respondent the opportunity to agree on a division of labor on this task and present the proposal to EPA for approval. If the two parties cannot agree, EPA will determine the division of labor and the Respondent shall carry out the work according to EPA's determination.

7.1 Baseline Sampling Planning

Respondent shall perform Task 6.2, Field Sampling Plan and Quality Assurance Plan, prior to performing the baseline sampling work. The Respondent shall not reference previously-approved documents used during the remedial investigation / feasibility study process but shall create new documents for the remedial design. The portion of these plans related to the baseline sampling shall include a list of the wells to be sampled and the rationale for the sampling, a justification for any wells not proposed to be included in the baseline sampling, and a list of the

chemical parameters and analytical methods to be used for each sample obtained. The plans shall include all other requirements presented in Task 6.2 and applicable EPA Guidances for Field Sample Plans and Quality Assurance Plans.

7.2 Field Work for Baseline Sampling

Respondent shall perform the sampling in accordance with the approved Field Sampling Plan and Quality Assurance Plan. The Respondent shall coordinate with any monitoring activities also being performed by Shell Chemical to ensure that the two programs are performed reasonably contemporaneously. The Respondent shall follow the Field Work Provisions in the General Requirements section of this SOW in performing this work.

7.3 Report for Baseline Sampling

Respondent shall prepare and submit to EPA a Sampling Report for the Baseline Sampling. The results of the sampling and analytical efforts shall be provided to EPA in electronic and hard copy form and will contain at a minimum the following information:

- A tabular compilation of water levels and associated survey data for each well sampled.
- A tabulation of chemical analysis data in a format consistent with that required by the Data Management Plan in this SOW.
- An updated map of each hydrostratigraphic unit being monitored showing the revised contours based on the baseline sampling for chlorobenzene, benzene, pCBSA, and TCE.
- Appendices providing copies of the laboratory reports and any Data Validation Reports.

8 Field Work for Monitoring

The Respondent shall implement the field work put forth in the approved MACP and FSP/QAPP according to the schedule put forth in the approved schedule of completion. Field work shall be conducted in accordance with the *Field Work Provisions* in the General Requirements section of this SOW. If the Respondent believes that the schedule will have to change, the Respondent shall contact EPA and request an approval of a change to the schedule of completion. EPA shall then determine whether to approve the requested change. The Respondent shall provide EPA with sufficient notice of, and information about, the field work for EPA to develop outreach materials to the public so that they are aware of the monitoring and compliance activities.

It is recognized that the Shell Oil Company is a Respondent to EPA under a separate enforcement instrument for the Dual Site Groundwater Remedial Design, and that some of the wells required to be monitored under the MACP will be sampled by Shell. EPA intends to afford Shell and the

Respondent the opportunity to agree on a division of labor on this task and present the proposal to EPA for approval. If the two parties cannot agree, EPA will determine the division of labor and the Respondent shall carry out the sampling work according to EPA's determination.

9 Process for Modifying the Monitoring and Aquifer Compliance Plan

Any changes to the MACP shall be approved by EPA in writing and incorporated into the approved MACP by EPA. Changes may occur by one of the following processes:

- Respondent proposes to modify the MACP. The Respondent issues a proposal to EPA identifying all aspects of the intended changes and seeks EPA approval. If EPA approves of the changes, EPA modifies the MACP to reflect the changes. Upon EPA's approval of the modified MACP, Respondent initiates field actions due.
- EPA determines that changes are necessary to the MACP. EPA issues a letter to the Respondent requesting to confer on the changes. After conference with the Respondent, EPA makes the changes to the MACP. Upon EPA's approval of the modified MACP, Respondent initiates field actions due.

10 Monitoring and Compliance Reports

On a frequency to be established in the approved MACP, the Respondent shall issue Monitoring and Compliance Reports (MACR) [DIN Suffix 042]. Each MACR shall contain the most current and all previous data from all monitoring wells in the monitoring well network as well as any wells sampled previously in the remedial design phase. In addition to the data in tabular form, the data shall be interpreted with updated analyses as follows, at a minimum:

- Results of all new data in an easy to use and understand format, including any sampling or measurements and in accord with the Data Management Plan for the Remedial Design;
- Detailed hydrostratigraphy of the area
- Groundwater flow directions and gradients (horizontal and vertical);
- Hydraulic and storage properties of the hydrostratigraphic units, if estimates have changed;
- Nature and extent of dissolved and/or free product contamination;
- Graphics depicting:
    - locations of sampling points

- hydrostratigraphic cross sections
- extent of contamination in each aquifer unit

- Groundwater elevation contours in each aquifer unit; and
- Conclusions on compliance and transgression of the containment zone based on the new data.

The MACR shall include the water quality and water levels measured during the effort both in tabular and graphical format, modified water level hydrographs and contour maps for the various water-bearing units, and reassessments of groundwater flow and gradients.

11 Additional Well Installations for Monitoring

The ROD requires that sufficient numbers of monitoring wells be installed to meet the objectives in the monitoring plan. If EPA, after consultation with the Respondent, determines that additional well installations are required to meet the monitoring objectives for the remedial design, then the Respondent shall install and sample these wells by accomplishing the following three tasks.

11.1 Work Plan: Well Installation, FSP and QAPP for Additional Monitoring Wells

Respondent shall develop and submit to EPA a Work Plan for Additional Monitoring Wells [DIN Suffix 043] that will meet the stated objectives in EPA's request for additional well installations. This work plan shall include the following major components:

- A description of existing data;
- An identification of the gaps in the current data;
- The identification and rationale for the number and locations of monitoring wells to be installed;
- Identification of the property owners at the locations of the proposed wells and any anticipated issues with short- and long-term property access;
- A complete description, including diagrams, of proposed well construction details and specifications; drilling method and all drilling equipment; all pertinent construction materials; measurements of borehole, casing, and annular space; depths of screened and blank casing; proposed pumps, transducers, and any other dedicated or temporary downhole equipment; methods to be used to determine depths and elevations; wellhead and well vault construction detail and specifications; and any other related details. Construction diagrams shall be provided relative to the stratigraphy encountered;

- A complete description of proposed well development procedures;
- A complete description of treatment and/or disposal of development water, drilling muds, and any other potentially contaminated media;
- The groundwater sampling procedures and chemical and physical parameters to be included in the sample analyses of the new wells, pending incorporation into the overall monitoring plan;
- A Field Sampling Plan (FSP). This plan shall include the detailed sampling procedures for collecting samples during the well installation and sampling that meet the data quality objectives (DQOs). The FSP shall include sampling objectives; sample locations and frequency; sampling equipment and procedures; sample handling and analysis; sample preservation, decontamination, and a breakdown of samples to be analyzed through the Contract Laboratory Program (CLP) and through other sources, as well as the justification for those decisions. The FSP shall be written so that a field sampling team unfamiliar with the site would be able to gather the samples and field information required. The FSP shall meet applicable EPA guidances. ***With EPA approval, this FSP may be combined in the same document with FSP information from other tasks in this SOW that require a FSP.***
- A Quality Assurance Project Plan (QAPP). The QAPP shall describe the project objectives and organization, functional activities, and data quality objectives, quality assurance/quality control (QA/QC) protocols that shall be used to achieve the desired data quality objectives DQOs. The QAPP shall meet applicable EPA guidances. ***With EPA approval, this QAPP may be combined in the same document with QAPP information from other tasks in this SOW that require a QAPP.***
- A site-specific health and safety plan shall be prepared with provisions for the data-acquisition work that specifies employee training, protective equipment, medical surveillance requirements, standard operating procedures, and a contingency plan in accordance with 40 CFR 300.150 of the NCP and 29 CFR 1910.120 1(1) and (1)(2). ***With EPA approval, a single comprehensive Health and Safety Plan that is inclusive for all Remedial Design may be created, and modified as necessary.***
- A schedule of completion shall be submitted to EPA that shall present a list of the major tasks associated with this data acquisition, along with the start and end dates of each task.

All of the above plans and documents shall be subject to EPA approval. Respondent shall modify the documents in accordance with EPA comments, if any.

11.2 Field Work for Additional Monitoring Wells

The Respondent shall implement the field work put forth in the approved Work Plan and FSP/QAPP according to the schedule put forth in the approved schedule of completion. Field work shall be conducted in accordance with the *Field Work Provisions* in the General Requirements section of this SOW. If the Respondent believes that the schedule will have to change, the Respondent shall contact EPA and request an approval of a change to the schedule of completion. EPA shall then determine whether to approve the requested change. The Respondent shall provide EPA with sufficient notice of, and information about, the field work for EPA to develop outreach materials to the public so that they are aware of the monitoring well installation and sampling activities.

11.3 Completion Report for Additional Monitoring Wells

The Respondent shall issue a Completion Report for Additional Monitoring Wells [DIN Suffix 044] documenting the results of the work completed under this task. Respondent shall modify the draft Completion Report for pCBSA Data Acquisition according to EPA comments, if any. ***With EPA approval, Respondent may combine in a single document the contents of this completion report with those of other completion reports required under this SOW.*** The Completion Report shall include:

- Well Completion Documentation, including but not necessarily limited to:
  - Exact well location with coordinates and map relative to surrounding area;
  - Well construction and materials detail;
  - Diagrams of well depths, casing, annular spacing, packing, screened interval;
  - Initial water levels and water quality data;
  - Property ownership and property access issues, including but not limited to permits and easements; and
  - Any other information necessary to document the completion of the wells;
- The objectives of the investigation;
- A description of the field activities documenting actual drilling, and sampling and analysis methods and procedures and how any of these may have differed from the Work Plan for Additional Well Installation;
- Results of any sampling or measurements collected as part of this additional well installation and sampling task;
- Detailed hydrostratigraphy of the area studied;

- Nature of dissolved and/or free product contamination encountered during the well installation;
- Graphics depicting:
  - locations of sampling points
  - hydrostratigraphic cross sections

12 Well Maintenance and Well Abandonment

The Respondent shall perform appropriate well maintenance and proper well abandonment in accordance with the MACP. A record of routine well maintenance performed shall be provided in the Monitoring and Compliance Report (MACR) corresponding to the time period in which the work was performed. In the event that abandonment of a well or wells is determined necessary by the Respondent (or in the less likely case that EPA itself determines that abandonment of a well or wells is necessary and notifies the Respondent of such determination in writing), the Respondent shall provide EPA with a brief Well Abandonment Plan [DIN Suffix 045] documenting the following:

- The reason that each well must be abandoned, a list of any alternatives to abandonment that were considered and the reasons such alternatives were not proposed;
- Either a statement that the standard well abandonment procedures in the MACP shall be followed, or a detailed explanation of how the procedures will differ from the MACP and why;
- The anticipated schedule for abandonment of each well;
- Traffic control and public protection procedures, if applicable; and
- A description of waste handling procedures and sampling to be performed, if any.

The Respondent shall modify this plan according to EPA comments, if any. Upon EPA approval of the plan, Respondent may abandon the well or wells in accordance with the plan. Within 30 days of abandonment of the wells, the Respondent shall provide to EPA a Well Abandonment Report [DIN Suffix 046] (which may be incorporated into the Monitoring and Compliance Report for the reporting period, if approved by EPA) which provides documentation of the field activities performed, dates that work was performed, difficulties or obstacles encountered and how they were addressed, field decisions made, and any other information pertinent to the abandonment of the wells. The Respondent shall modify this report in accordance with EPA comments, if any. The Respondent shall repeat the process of generating a Well Abandonment Plan and Well Abandonment Report as necessary when well abandonment needs arise.

List of Deliverables

Only major deliverables, not interim minor deliverables, are included in this list

Deliverable number sequence contains gaps as the UAO does not cover all design work

Deliverable Identification Number	Name of Deliverable
DSGWRD 0926/36-**001**	Data Management Plan
DSGWRD 0926/36-**002**	Work Plan for TCE Plume Data Acquisition (Includes field sample plan and quality assurance plan)
DSGWRD 0926/36-**003**	Site Specific Health and Safety Plan
DSGWRD 0926/36-**004**	Completion Report for TCE Data Acquisition
DSGWRD 0926/36-**007**	Work Plan for pCBSA Data Acquisition (Includes field sample plan and quality assurance plan)
DSGWRD 0926/36-**008**	Completion Report for pCBSA Data Acquisition
DSGWRD 0926/36-**009**	Production Well Survey Report
DSGWRD 0926/36-**010**	Compilation and Update of Other Sources Data Report
DSGWRD 0926/36-**015**	Remedial Design Activity Plan and Schedule
DSGWRD 0926/36-**016**	Work Plan for Groundwater Model Development
DSGWRD 0926/36-**017**	Sensitivity Analysis Report
DSGWRD 0926/36-**018**	Aquifer Testing Plan
DSGWRD 0926/36-**019**	Aquifer Testing Results Report
DSGWRD 0926/36-**020**	Work Plan for Additional Monitoring Wells for Model Refinement
DSGWRD 0926/36-**021**	Completion Report for Additional Monitoring Wells for Model Refinement
DSGWRD 0926/36-**022**	Model Documentation Report
DSGWRD 0926/36-**023**	List of Proposed Modeling Scenarios

List of Deliverables

Only major deliverables, not interim minor deliverables, are included in this list

Deliverable number sequence contains gaps as the UAO does not cover all design work

Deliverable Identification Number	Name of Deliverable
DSGWRD 0926/36-**024**	Optimization of Wellfield and Well Rate Distribution Report
DSGWRD 0926/36-**031**	Preliminary Pipeline Corridor Analysis and Easement, Access, and Permitting Requirements
DSGWRD 0926/36-**041**	Monitoring and Aquifer Compliance Plan
DSGWRD 0926/36-**042**	Monitoring and Aquifer Compliance Reports
DSGWRD 0926/36-**043**	Work Plan: Additional Well Installations for Monitoring (with FSP and QAPP)
DSGWRD 0926/36-**044**	Completion Report for Additional Well Installations for Monitoring
DSGWRD 0926/36-**045**	Plan for Abandonment of Wells
DSGWRD 0926/36-**046**	Completion Report for Abandonment of Wells